

OCTOBER 2012 COMPARISON OF STATE ELECTRONIC WASTE RECYCLING LAWS TO INDIANA'S
LAW

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Abstract

In the digital age there has been a consistent push for consumers to invest in the latest and greatest technology. With the 2009 requirement that television broadcasters switch from analog to digital signals, many consumers have upgraded televisions that are capable of decoding this signal. For the most part this meant upgrading from cathode ray tube devices (CRTs) to flat panel displays. In addition upgrades in technology in computers and cellular networks have made several computers and mobile phones obsolete. Improper disposal of these items can cause a great deal of environmental harm. When CRTs are disposed improperly lead can be released to the surrounding environment. Other electronics may contain high amounts of lead, barium and mercury. These electronics can contain valuable materials as well, such as gold, which can be recovered from obsolete devices.

Because of the environmental damage that can occur when electronic items are disposed of improperly, 29 states have passed legislation which encourage recycling of electronic devices and discourage the disposal of these items in landfills. Many of these states have passed producer responsibility laws which makes the manufacturer of electronics responsible for providing end-of-life disposal options other than landfill or incinerator disposal of items. Because each state legislature is different, rules that are in place differ. This paper separated the 29 states that have passed legislation into five groups based on the type of law in place. Each state's legislation and rules are summarized. The majority of these states belong to a group which requires manufacturers to set up recycling programs for residents and the manufacturers must meet a predetermined recycling goal. The next group contains seven states that require manufacturers to implement collection programs for residents so they can recycle

their old electronics but, manufacturers are not required to meet a collection and recycling goal. Six states have responded with legislation that puts the state in charge of collection of electronic devices with manufacturers paying for the programs. Five states belong to a group which requires either education of residents on how to recycle electronics or prohibits residents from disposing of certain devices in landfills. Last, is California which runs a statewide collection program but, residents pay for collection of items through a fee at the time of purchase of new electronic items.

The other 21 states that do not have legislation are broken down into three groups. The first, and largest group, consists of states that either have not proposed or provided information about proposed legislation for electronics recycling. The second group looks at six states that had proposed legislation in the past to see what was proposed and why the legislation did not pass. The third group contains four states that passed legislation for study committees to look into passing legislation for recycling.

The paper concludes by looking at the potential sources of confusion for consumers and manufacturers that are required to register with individual states. Electronic devices that are covered by state legislation differ and manufacturer registration dates, fees, reporting requirements and recycling requirements differ as well. Consumers in some states can receive free recycling on some but not all items. The paper concludes by examining national legislation that has been proposed but is unlikely to pass due to the legislation being held in committee for over a year.

Introduction

During the Super Bowl in 2011, Best Buy ran a series of advertisements detailing their electronics buyback program. These ads were meant to be humorous with one showing a man unloading his new 3D television from his car and immediately becoming upset when he saw a billboard promoting the latest and greatest 4D television. Other ads showed angry buyers of computers being informed about the newest technology and another featuring rock legend Ozzy Osbourne and pop star Justin Bieber filming ads for the future promoting the new 5G and 6G mobile phone networks. Although these advertisements were meant to be humorous they illustrated the amount of constant change and improvement in the technology in our electronic devices. At the same time they show the desire of consumers to have these 'improved' devices. With the constant desire to improve our electronic devices, new end of life management strategies need to be implemented to reduce the amount of these devices ending up in our landfills and incinerators. States have responded by passing legislation to promote and require recycling of electronic waste. State to state legislation as well as funding for programs can differ, which may lead to confusion among manufacturers on the reporting requirements, fees and dates information is due to state environmental agencies. The goal of this paper is to compare states that have passed electronics recycling legislation through October 1, 2012. States will be compared on the manufacturer requirements, such as whether they must fund a state run program, contract with collectors and recyclers within the state to recycle a certain weight of electronic items, or if they must make collection programs available to residents. States without legislation will be compared looking at legislatures that have attempted to pass laws and what potential roadblocks exist in these states.

The increasing trend of electronics sales is noted by the EPA in a 2008 report combining data from the Consumers Electronics Association Market Research for televisions dating back to 1980 breaking down the sales of televisions by cathode ray tube (CRT), flat panel televisions, color projection and monochrome. From 1980 to 2007 the total number of televisions increased from about 17 million units a year in 1980 to a number hovering around 30 million units per year from 1999 to 2007. Although a trend cannot be noted based on the information available, the number of CRT televisions sold dropped dramatically in 2007 compared with 2006. In 2006 the number of CRT televisions sold was 16.8 million compared to 6.3 million units in 2007. This is encouraging as the primary hazard of CRTs when improperly disposed of is the lead content. To go along with the increased amount of televisions sold, the EPA report shows the number of cellular phones sold has skyrocketed. In 1995 only 12.4 million units were sold. Ten years later the number of cell phones sold was 150 million and jumped to 181.9 million units sold in 2007. In 2011, the EPA projected that 235.6 million cell phones/mobile devices were sold in 2010 (EPA Electronics Waste Management in the United States Through 2009, May 2011). The number of computers and computer related products sold (mice, keyboards...) increased dramatically since 1980. In 1980 just fewer than 1 million desktop computers were sold with a similar number of keyboards and PC CRT monitors sold in that year. The number of desktop CPUs sold jumped to 19.14 million in 1995 and peaked at 40.8 million in 2000. Since 2000 the number of desktop units sold has slowly declined with 23.5 million projected to be sold in 2010. The number of portable computers sold has increased from 1.85 million in 1992 to 46.4 million units sold in 2009. The computer peripherals sold have followed the trend of desktop CPUs where the number of devices sold increased into the early 2000s, peaked, then declined slowly since. Computer displays have mirrored the trend witnessed in the television market where PC CRT

monitors increased from fewer than 1 million sold in 1980 to about 18.1 million in 1994 and peaked at 37.47 million units sold in 2000. The number of PC CRT monitors sold has declined since 2000 with only 19,700 units being sold in 2010. Flat panels have replaced the CRT for PCs with a peak of 41.58 million units sold in 2007 and a slow decline to about 27.5 million in 2010.

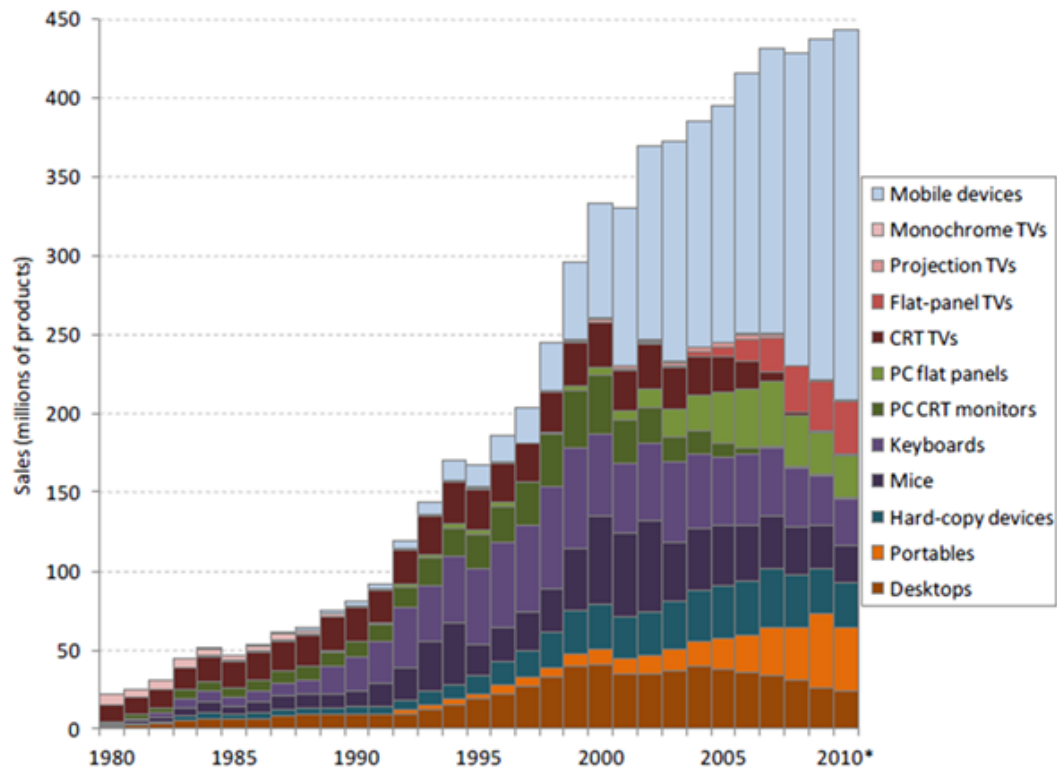


Figure 1: Sales of electronics products by model year, in number of units sold. *Results for 2010 are projected based on estimates from previous years. (EPA Electronics Waste Management in the United States Through 2009, May 2011)

Overall the EPA 2011 electronic waste management report estimated that 438 million new electronic products were sold with 5 million short tons in storage and 2.37 million short tons ready for end of life management in 2009. The EPA provides a flow chart for the life cycle of electronic products. Raw materials and upstream production are noted but not modeled by the EPA. The purchase and use of products is used by the EPA to determine the sales data, weight of

products and lifespans of the products. After the device has served its purpose it is sent to storage where a better estimate of lifespan and storage estimates are made. End of life management from the storage phase takes two routes: collection for recycling or disposal. EPA data is not collected from disposal of electronic waste in waste to energy facilities or to landfills. Information on the collected items is broken down and obtained from recycler surveys on how many products are reused or refurbished or how many products are recycled and the amount of materials that are recovered from the product.

In the United States the preferred method of disposing of these computer components follows the “state of the art recycling technologies” set forth by both the E-Waste Guide and the EMPA. The first step of the process is detoxification of the product. In this step waste that is collected is broken down to separate critical components from components that recyclers are trying to recover. For the Indiana program this is what solely defines a recycler; the breakdown of waste electronic equipment. Materials are then shredded and various other steps are used in the process to further separate components and reduce their toxicity. Last, the materials are refined into more manageable sizes where they are either sold as recycled materials or prepared for proper disposal.

There are downfalls to electronic waste recycling for residents. Several news stories and articles have detailed how these materials cannot be properly handled. The most recognizable was a story by “60 Minutes” where Scott Pelley followed materials that were collected at an e-waste event in Colorado. The materials that were collected for recycling were actually shipped to China and other countries where environmental laws are either lacking or if in place lacking enforcement by local government. In these countries the waste is handled in several methods but the most popular according to the EMPA included: incineration, open burning of materials

or landfilling of materials. Incineration of materials can lead to cancer forming dioxins. Open burning of materials creates a variety of health related problems. First the smoke itself can cause asthma, coughing and eye irritation. Polyvinylchloride (PVC) may be present in these flames, which can lead to the formation of hydrochloric acid which can damage lung tissue further. Landfilling materials can be harmful as well because heavy metals such as Cadmium, Lead and Mercury can leach from the materials and contaminate the soil and ground water near the landfill. A study by Xia Huo et al. in 2007 found that lead levels in children under the age of 6 in the Chinese electronic waste city of Guiyu was an average of 15.3 µg/dL. In addition, it was found that children from a neighboring town where no e-waste was being disposed had an average blood lead level of 9.94 µg/dL. The US Centers for Disease Control and Prevention (CDC) recommend public health actions to be initiated when children ages 1 – 5 have blood lead levels above the reference level of 5 µg/dL (CDC – Lead, July 2012). The CDC has identified the “level of concern” for elevated blood lead levels in children as 10 µg/dL. Above this level adverse health effects can include damage to the brain and nervous system, learning problems and slowed growth. The study in Guiyu did not identify any differences in the blood hemoglobin levels or the physical growth and development of the children, but the potential health effects down the road from long term exposure to lead from e-waste is a concern.

Electronic waste cannot be exported to developing countries based on the United Nations Basel Convention (Basel Action Network – About the Basel Ban). This convention, and the Basel Ban Amendment, prohibits developed countries from exporting all hazardous waste to developing countries, including electronics. Decision II/12 from the conference set December 31, 1997 as the final day that these trans-boundary movements of hazardous waste for recovery or recycling could occur (Basel Action Network). The United States to date has signed the

agreement of the convention but has not ratified the agreement (EPA – Basel Convention; Basel Action Network – Country Status).

The goal of this project is to first obtain as much practical information as possible about electronic waste recycling legislation in the United States as of October 1, 2012. Information was requested from states through letters sent to each state's environmental agency in charge of electronics disposal. From here, information was obtained through a series of phone and electronic mail communication on the status of individual states electronics recycling policies. A review of state environmental websites and legislation, if applicable, was conducted to gain further knowledge of the programs in place. The goal of this review is to increase the knowledge available to the public and to manufacturers on state electronic recycling programs. Greater knowledge of state programs can lead to increased recycling of electronic waste, reduce the amount of waste going to landfills and incinerators, and decrease the potential of exposure of harmful compounds in these devices.

Literature Review

This section of the paper contains a review of extended producer responsibility that has been implemented by manufacturers, states and countries. This is followed by an extensive review of the legislation that was implemented by the state of Indiana for electronics recycling. This section will conclude with a brief comparison of state legislation in place as of October 1, 2012.

Extended Producer Responsibility

Indiana's law, as well as many other states electronic waste recycling laws, is an example of extended producer responsibility or product stewardship (Personal Communication, Summer 2012; Greenpeace, 2006). The idea of extended producer responsibility originated in the early 1990s in Europe to address lifecycle issues of products, especially what happens to them at the end of their life (Greenpeace, 2006). The concept requires everyone in the product life cycle – manufacturers, retailers, consumers and disposers - to be responsible for the environmental impacts of their products (US EPA, 2012). The US EPA (2012) considers this one of the best approaches to the increasing new stream of waste produced in the United States. Extended producer responsibility can be very beneficial for manufacturers. Xerox Corporation created Asset Management Recycling to take back used products (US EPA 1998). These products can be remanufactured, converted or disassembled at their facility and the practice saved Xerox \$50 million in its first year of operation. Ford Motor Company followed a similar model to recycle old plastic bumpers to make new bumpers. The resulting savings were about \$2 million a year.

A Greenpeace report on extended producer responsibility (Greenpeace, 2006) went further and broke down four different types of extended producer responsibility. This information was based on a 1998 report by Thomas Lindhqvist. The first is liability which covers the responsibility for proven damage to the environment. This liability is determined by laws and can include different parts of the life cycle. The second is financial responsibility which has the manufacturer responsible for the collection, recycling or disposal of a product directly or indirectly. Third is physical responsibility where the manufacturer is solely responsible for the product throughout its life. This could lead to 'ownership' of the product and make them responsible for the environmental problems associated with the product. Last, is informative

responsibility in which the manufacturer is required to provide consumers information about the environmental properties of the product.

Extended producer responsibility has been used in numerous locations since the 1990s. In the Canadian province of Ontario large packaging facilities were required to pay a fee for municipal recycling (EPA EPR for Packaging Ontario Case Study Webinar, 2010). Brand owners and 'first importers' of goods are the stewards in this program. They are responsible for paying for approximately 50% of the municipal residential blue box programs. The blue box program shows the shared responsibility of residents to recycle these goods. There are some exemptions for 'stewards' in this program based on sales and weight of materials but stewards pay for this program based on the amount of packaging they produce and the type of product they produce. The products included in the program were glass, metal, paper, plastic and textiles as well as any combination of the above. In Ontario there were over 4200 stewards that qualified for the program but only 1951 were required to pay for this program. Overall the recovery for these products in 2008 was 63%. Some items did better than others with recovery and recycling. Printed paper was recovered at a rate of 79% and glass was recovered at 83%. On the other end of the spectrum only 22% of plastics were recovered and 39% of aluminum was recovered and recycled.

In 1998, Switzerland passed e-waste legislation to promote the formal collection and management of electronic waste (Khatriwal, 2007). This law backed the voluntary efforts that were initiated prior to the passage of the legislation. In 2003, e-waste contributed to approximately 2.6% of the municipal solid waste stream in Switzerland. The Swiss law specifically defines all parties that are responsible for the final disposal of these electronics. The government acts as the overseer of the program. Manufacturers oversee the daily operations of

the program as well as set the recycling fees for the program. Retailers sell the products to consumers and include the amount of money that consumers pay to run the program when purchasing new electronic devices. Consumers bear most of the financial responsibility of the program. Collectors in the program collect waste electronic equipment free of charge and ensure it is disposed of properly. Last, the recyclers breakdown the equipment within environmental health and safety standards that are set by both Switzerland and the European Union. The program has been very effective at reducing the amount of electronic waste that is sent to landfills (Kheriwal, 2007; Swiss EMPA E-waste Info). Once all the precious metals are recovered, raw materials that cannot be recovered are incinerated for energy recovery. The remaining 2% that is unable to be recovered or incinerated is sent to landfills for proper disposal.

Indiana's Electronic Waste Program

July 1, 2009 the Indiana Electronic Waste Program went into effect. The language for the law is located in Indiana Code 13-20.5 and is split into ten chapters defining the three groups involved in this program, registration fees, list of incentives to members in these groups, and reporting requirements for this program.

Chapter 1 of the legislation spells out the registration associated with the E-Waste program. If a manufacturer of a video display device (VDD) sells the device in Indiana they would be required to register with the Department of Environmental Management by April 1, 2010 and April 1 for every year following 2010. After April 1, 2010 any manufacturer that begins to sell or offer these VDDs must submit a registration for this program no later than 20 days after they first offer the device in Indiana. The manufacturer's registration must include a list of brand

names they use for the device regardless if they own or lease the brand. They must also include contact information for the person that works for compliance in the program. They then must include a certification that they have complied and will continue to comply with the terms of the program. The registration must include an estimation of the number of pounds of their VDDs sold to households in the most recent 12 months. Last, they must list how they will meet their recycling goal and include a disclosure of any devices that exceed maximum concentrations of various toxic substances.

The Department of Environmental Management is required to review and inform manufacturers of any potential issues with their registration within 30 days of receiving the registration. Corrections need to be submitted in a new registration form which can be found on their website at http://www.in.gov/idem/5157.htm#op2_elecwaste. Last, the Department of Environmental Management is required to maintain a list of manufacturers and their registered brands on the department's website.

Chapter 1 of the legislation also requires that collectors of electronic waste register with the Department of Environmental Management using the registration form available on the IDEM website. In this registration, the contact information of the person operating the facility must be included as well as all sites where waste is collected. Collectors must indicate the type of materials they accept and comply fully with the electronic waste clause in the Indiana Administrative Code solid waste management provisions (329 IAC 16). The registration is effective when the department receives the form and is valid for one year from that date. Recyclers that register with the Indiana Electronic Waste Program have similar requirements as collectors but they may be subject to providing a contingency action plan. They may also have to obtain a surety bond to provide IDEM with financial assurance needed to clean up and close a

facility in case the owner/operator abandons or improperly closes a facility (IDEM Permit Guide, e-waste). Collectors and recyclers in Indiana may also be subjected to a site visit by IDEM to that assure the facility is complaint with 329 IAC 16. If either collectors or recyclers violate regulations set out by the E-Waste Legislation or 329 IAC 16 IDEM may revoke their registration. There is no fee for collector and recycler registration.

Chapter 2 of IC 12-20.5 spells out the fees that apply to manufacturers as well as the electronic waste fund. Manufacturers that register with the program are required to pay a \$5,000 fee for the first year they register. For every year they renew, the registration fee is \$2,500 and this money is deposited in the electronic waste fund. Manufacturers are also subject to a variable recycling fee once the third year of the program ends (for manufacturers) on March 31, 2013. The amount manufacturers have to pay for this fee varies based on the percentage of pounds the company recycles based on their recycling goal as set by Chapter 4 of the legislation. If a company recycles less than 50% of the goal set in their registration, they must pay \$0.40 per pound they are under the recycling goal. If they recycle at least 50% but less than 90% of their goal, they must pay \$0.30 per pound. If they do not meet the recycling goal but recycle at least 90% of this goal, they must pay a fee of \$0.20 per pound. If a manufacturer produces less than 100 VDD for sale to households they are not subjected to this variable recycling fee or a registration fee.

Manufacturers can receive incentives for the pounds of e-waste recycled to ensure that they meet their recycling goal. If a covered electronic device (CED) is recycled in Indiana the number of pounds recycled is multiplied by 1.1. A multiplier of 1.5 is given to manufacturers that recycle CEDs from non-metropolitan statistical areas, as defined by the federal Office of Management and Budget. If the manufacturer arranges for recycling of CEDs from non-

metropolitan areas and recycles these devices in Indiana they receive a 1.6 pound multiplier. If a manufacturer recycles more than their recycling goal states they will receive recycling credits. Credits are in place to encourage greater recycling and reduce or eliminate the potential of paying the variable recycling fee. Recycling credits are equal to 0.25 pounds for every pound by which they exceed their goal. Credits may be used within three years or sold to other manufacturers at a price negotiated by each party. A unique feature that could influence the results for the first year of the program is found in IC 13-20.5-2-1(f)(2) which states that manufacturers can use recycling information from the time the program was enacted (June 30, 2009) up until April 1, 2010 for use in the first reporting year of the program.

Chapter 3 contains the reporting requirements for manufacturers, collectors and recyclers. Manufacturers are required to submit an annual report for the previous program year by June 1. Manufacturers are required to report an estimate of the total number of pounds of electronic devices sold in Indiana; this can be based on total sales in Indiana or as a percentage of the Indiana population multiplied by national sales data. They also must include the recyclers and collectors used and, if applicable, include the number of recycling credits they will receive, how many credits they possess and how many they intend to use. Last they must list the total number of pounds (as well as incentive pounds) they recycled in the program year that ran from April 1 of the previous year to March 31 of the reporting year.

Collectors and recyclers are required to submit reports by April 1 for the previous program year. Recyclers must submit the report and include the number of pounds of CEDs recycled by the recycler as well as pounds taken by the recycler for final disposal. They must certify that they complied with the regulations in place for the disposal of the CEDs. Collectors

must submit a report which includes the total weight of CEDs collected in Indiana. They must list the recyclers to whom they delivered these devices.

Chapter 4 includes manufacturer responsibilities under the Indiana E-Waste Program. Manufacturers are required to recycle or arrange for the recycling of at least 60% of the total weight they reported sold in their registration. Manufacturers are responsible for obtaining this information from collectors and recyclers which are registered with the Indiana program. They must maintain three years of documentation of all CEDs recycled or partially recycled. Last they must provide contact information for an individual who is responsible for assuring compliance with this law.

Chapter 5 of this law states that recyclers are not responsible for data that is in recycled devices. Consumers are responsible for ensuring all personal information is removed from devices. Chapter 6 requires retailers to provide information to households that purchase new VDDs on where and how they can recycle VDDs. They may provide this information by providing department contact information or an Internet web address. If the retailer sells through catalogs or the internet, they should have a prominent location in the catalog or on the website to inform them how and where to recycle their VDD. Chapter 7 of the legislation describes duties that IDEM must take such as completing reports on the progress of the program, promotion of the program and suggestions on what should be done department wise if Indiana joins a regional E-Waste program or a national program is instated.

Chapter 8 places limitations on the government requiring covered entities from using public recycling facilities. It also states that collectors, recyclers and manufacturers may charge for collection of CEDs. Chapter 9 sets regulations for state agencies on purchases of electronic

devices. Chapter 10 places a disposal prohibition on covered entities (household, public school or small business doing less than \$10 million annually) from mixing any CED in municipal waste intended for disposal in a landfill. This prohibition took effect January 1, 2011. If a covered entity violates this prohibition they are not subjected to criminal or civil action, penalty or any other sanction. Indiana has implemented changes to their program which go into effect for the 2013 program year. Manufacturers will have a program year that is similar to collectors and recyclers and runs the length of the calendar year. Manufacturers are now required to register by January 1. Variable recycling fees were to go into effect during the third program year but have been delayed because of the changes to the manufacturer's program year.

Several conversations with a representative from the state have indicated that Indiana's legislation is closely modeled after the legislation in place in the state of Minnesota. The main difference among the two programs is what is considered an electronic device for recycling. An example of this is whether a video display screen has a 4 inch or 7 inch diagonal display. Cell phones are another item that could determine whether they have to register for state programs. Last, fees to register and reporting dates and requirements vary causing confusion among collectors, recyclers and manufacturers in the various programs. The changes were implemented to make reporting easier for all groups and to ensure consistency in the reporting of pounds recycled.

Comparison of State Legislation

Because the potential for variation exists in states that have electronic recycling legislation, the states may be divided into two categories. The first category includes states with electronic recycling legislation in place (Table 1). This category is broken down into five

subcategories. Each subcategory contains states with similar legislation. The first subcategory includes states that run their own electronic device collection and recycling program and are funded by manufacturers. This subcategory contains six states. The second subcategory contains only one state, California. California operates a unique electronic device collection program in that the funding for the program comes from an advanced fee charged to the consumer when they purchase new electronic devices. The third subcategory is the largest with 10 states. This subcategory contains states that have put manufacturers in charge of providing collection for recycling in the respective state. Manufacturers are required to recycle a predetermined number or weight of electronics. Failure to meet the goal set by the state can result in financial punishment. South Carolina would be part of this group however; an attempt at legislation to set up the punishments for manufacturers did not pass the legislature during the 2012 session. Thus, they are grouped with the fourth subcategory of states. This subcategory contains states that require manufacturers to provide collection programs but does not require the manufacturer to collect a certain amount of electronic devices. The fifth and final group includes states that have passed landfill disposal bans but do not require recycling programs to be developed. States that require manufacturers or states to provide education to residents on the proper handling of electronic items are included in this group as well.

The second category contains the final 21 states that do not have legislation in place requiring electronic devices to be recycled. This group is broken down into three subcategories. The first sub category contains states that have proposed legislation in the past but the legislation failed for various reasons. The second subgroup contains states that have legislation requiring study committees to be developed to look at the potential of implementing an electronic waste recycling program in that state. The final subgroup contains 11 states that

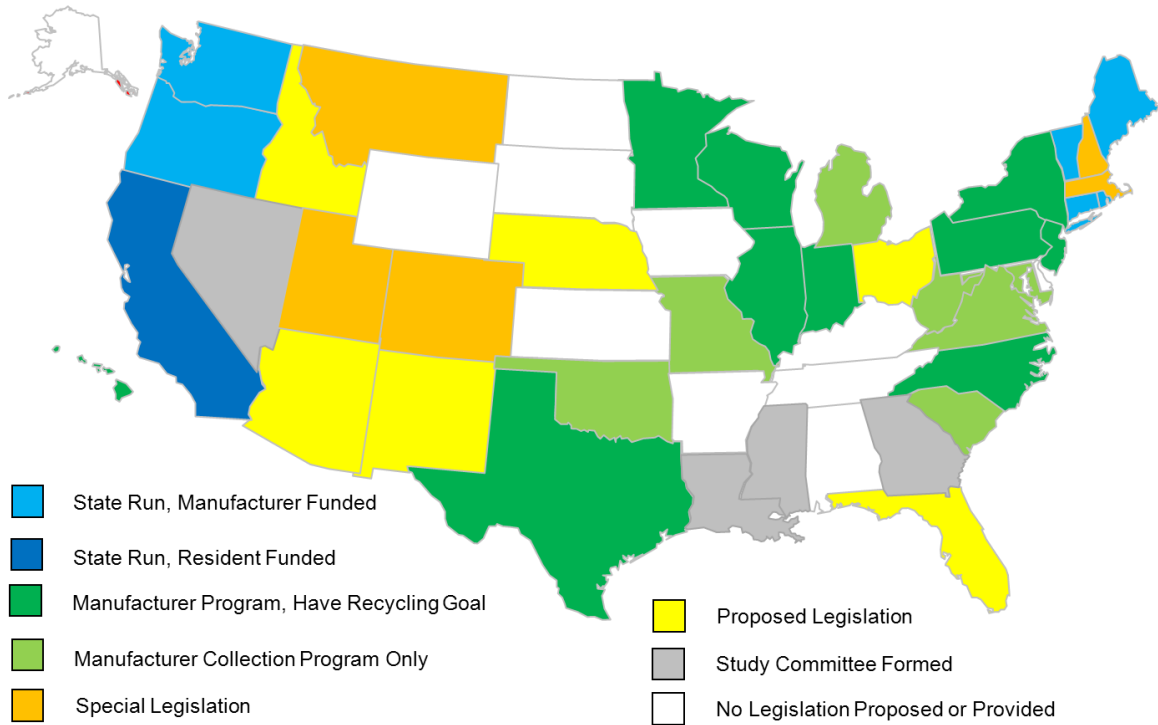
either have never proposed legislation for electronics recycling or the information on proposed laws was not provided for this research.

Table 1: States With Electronic Recycling Legislation				
State Run Programs with Manufacturers Funding	State Run Program, Resident Funded	Manufacturers Provide Collection Programs, Must Meet Recycling Goal	Manufacturer Collection Program Only	Special Legislation
Connecticut	California	Hawaii - Televisions Only	Maryland	Colorado
Maine		Illinois	Michigan	Massachusetts
Oregon		Indiana	Missouri	Montana
Rhode Island		Minnesota	Oklahoma	New Hampshire
Vermont		New Jersey	South Carolina *	Utah
Washington		New York	Virginia	
		North Carolina - Televisions Only	West Virginia	
		Pennsylvania		
		Texas - Televisions Only		
		Wisconsin		
* South Carolina had a recycling requirement for Television Manufacturers; Failed legislation prevented this from being implemented in 2012.				

Table 2: States Without Recycling Legislation		
Proposed Legislation	Legislation Not Proposed <u>Or</u> Provided	Study Committee formed
Arizona	Alabama	Georgia
Florida	Alaska	Louisiana
Idaho	Arkansas	Mississippi
Nebraska	Delaware	Nevada
New Mexico	Iowa	

Ohio	Kansas	
	Kentucky	
	North Dakota	
	South Dakota	
	Tennessee	
	Wyoming	

Figure 2: Electronic Recycling
Legislation as of October 1, 2012



States with Electronics Recycling Legislation

This section of the paper contains five subcategories of state legislation with implemented or encouraged recycling of electronic devices. The five subcategories are: state run programs with manufacturer funding, state run programs with resident funding, manufacturers provide collection and must meet a recycling goal, manufacturer collection program only, and states with special legislation. In all 29 states fit into this category and 28 will be summarized here (Indiana was summarized in the literature review portion of the paper).

State Run Programs with Manufacturer Funding

Connecticut Electronics Recycling (CT DEEP, *Electronics Recycling Law Homepage*, Oct. 2012)

In July of 2007, the state of Connecticut passed legislation (CT Substitute HB 7249, 2007) which set up a state operated plan for the collection, transport and recycling of covered electronic devices (CEDs) from households in the state. Connecticut defines CEDs as: desktop of personal computers, computer monitors, portable computers, CRT-based and non-CRT-based televisions or any other similar or peripheral device. CEDs do not include telephones unless they contain a video display area greater than four inches or handheld devices that connect to commercial mobile radio services, etc. (CT DEEP, Manufacturer Registration Instructions, 2011; CT General Assembly Ch. 446n Sections 22a 629 – 900). Manufacturers of CEDs that wish to sell their items in the state were required to register with the Connecticut Department of Energy and Environmental Protection (CDEEP) by January 1, 2008. Last, residents are prohibited from disposing of their waste electronic items in solid waste facilities in the state starting January 1, 2011.

Manufacturers that register with the CDEP before January 1, 2008 must pay an initial registration fee of \$5,000 unless they sold fewer than 100 CEDs in the 2007 calendar year. Registration between January 1, 2008 and June 1, 2010 would cost the manufacturer either \$6,000 or \$5,000 plus 1% of the weight of the orphan share (CEDs collected and recycled but the manufacturer of the item is unable to be determined) for the previous year times 50 cents, whichever is greater. After June 1, 2010 the same initial registration fee calculation applies (CT E-Waste FAQ, Mar. 2012). Manufacturers of printers registration fee is their percent market share multiplied by the annual budget of the CDEP to run the program until June 1, 2010. After this date, initial registration fees are calculated as they are for all other CED manufacturers. Annual renewal fees for all manufacturers is based on the percent market share owned by the manufacturer times the annual budget for CDEP to run the E-Waste collection and recycling program.

For the statewide recycling program, each municipality is required to have an electronics collection program established by July 1, 2009 (CT Substitute HB 7249, 2007). Municipalities may cooperate to form regional collection programs provided residents have reasonable access to the collection facility. Covered electronics recyclers are required to fairly reimburse municipalities for items collected for recycling and maintain a log of the brand, type and weight of items received and recycled. Manufacturers are responsible for directly paying registered electronic recyclers reasonable transportation and recycling costs for CEDs.

Maine Electronics Recycling

In 2004, the state of Maine passed legislation, which was amended in 2009 and again in 2011, to set up a state operated electronic waste collection program (Maine Revised Statutes

Title 38, Ch. 16 Sec. 1610). This program is free to residents, schools and small businesses (less than 100 employees) of the state. The program is funded primarily by manufacturers of covered devices and by municipalities that collect the devices. Covered electronic devices (CEDs) include: Computer CPU, desktop printers, video game console, cathode ray tube (CRT), CRT devices, flat panel display or other displays that is greater than four inches diagonally including televisions. Manufacturers that are not compliant with this law are prohibited from selling their electronic devices after January 1, 2006. Retailers are responsible for ensuring all devices sold are from compliant manufacturers. Cell phones are not covered by this legislation but separate legislation (Maine Revised Statutes Title 38, Ch. 16 Sec. 2143) requires retailers to collect old devices at no cost to the consumer. All CEDs and cell phones are banned from disposal in any Maine solid waste facility (MDEP E-Waste Webpage, Oct. 2012).

Manufacturers are required to register with the Maine Department of Environmental Protection (MDEP, Manufacturers Guide to Maine's E-Waste Recycling Law, Oct. 2012) by July 1 of each year. The registration must include the contact information for manufacturers, brand names sold in the past and present, way their devices are labeled with their name, methods of sale, annual national sales data, consolidator used, and registration fee. If the manufacturer has less than 0.1% of the national market share, their registration fee is \$750. Otherwise the registration fee is \$3,000.

Municipalities that choose to participate in the state program may collect no more than 7 items from any covered entity at one time (MDEP Electronics Recycling, Oct. 2012).

Municipalities may designate a local or regional solid waste transfer station or recycling facility as the drop off location for their residents. Collected electronics are delivered to consolidators where the manufacturer of each waste computer monitor and desktop printer is recorded. The

number of these items collected must be reported to MDEP by March 1 each year.

Manufacturers must work with consolidators to pay reasonable fees for the handling, transportation and recycling cost of their devices. Additionally, computer monitor and desktop printer manufacturers are responsible for paying for the recycling of orphan devices. This is calculated by multiplying the cost of the orphan devices by the return share of these devices.

Oregon Electronics Recycling

In May of 2007 the state of Oregon passed Enrolled House Bill 2626 which implemented a state operated recycling plan which would be funded by manufacturers. Manufacturers could choose to implement their own collection programs of covered electronic devices (CEDs) for recycling or join a state operated recycling program. This legislation defined CEDs as a computer monitor with a viewing area of at least four inches, a desktop or portable computer, or a television with a viewing area of at least four inches (OR Enrolled HB 2626, 2007). Enrolled Senate Bill 82 passed in 2011 adding computer peripherals such as keyboards and mice as well as printers to the list of covered devices starting in January 2015. Devices not covered by this legislation include any part of household appliances, industrial or medical equipment that contains computers and/or video displays and telephones unless they have a viewing area four inches or greater. CEDs are eligible to be collected from Oregon households, small businesses (fewer than 10 employees), not-for-profit organizations or any person giving seven or fewer CEDs to a collector at any one time. Last, the 2007 legislation (OR Enrolled HB 2626, 2007) placed a disposal ban on CEDs in Oregon landfills and incinerators starting on January 1, 2010.

Before January 1 of each year manufacturers are required to register with the Oregon Department of Environmental Quality (ODEQ More about Oregon E-Cycle, Oct. 2012). The

registration must include a list of all brands sold or imported by the manufacturer, whether they will be implementing their own collection plan or participating in the state plan and any other information requested by ODEQ. Manufacturers will pay registration fees based on a four tier schedule with tier 1 containing manufacturers with at least 1% of the market share of the total number of CEDs sold in the previous calendar year; their registration fee was \$15,000. Tier 2 included manufacturers with less than 1% market share but at least 0.1% of the market share with registration fees being \$5,000. Tier 3 included manufacturers with at least 0.01% market share but less than 0.1% with a registration fee of \$200. All other manufacturers paid a \$40 registration fee. These fees applied from 2008-2011 and were still in place for 2012 as the department considered different fee structures. Manufacturers that cease selling items in the state still must register and pay a \$250 registration fee. After 2012 the department will set up a seven tier registration structure similar to the fee structure in Washington. The max amount that can be paid by manufacturers will be \$35,000 (ODEQ, Oregon E-cycles Registration Fee Changes, June 2012).

Manufacturers that wish to implement their own program were required to submit information detailing how they would finance and collect electronic items from covered entities in the state (ODEQ More about Oregon E-Cycles, Oct. 2012). A collection site must be maintained in each city with at least 10,000 residents and provide free collection to all residents unless they provide 'premium services' such as curbside pickup of the CED. Manufacturers that implement their own programs are required to meet their return share as set by the state. Failure to do so will result in a fine equivalent to the amount of money the department determines the manufacture would have paid for collecting that weight of items, plus 10%. Manufacturers that operate their own collection program, as well as operators of the state

program, must sample a significant portion of items returned and recycled and categorize the items by type, manufacturer and weight. This calculates the return share and can incur an additional recycling fee that manufacturers must pay by September 1 each year to cover the costs of collecting, transporting and recycling CEDs.

Rhode Island Electronics Recycling

In June 2008 the Rhode Island legislature approved a law which would require manufacturers to register with the state and either provide recycling opportunities to residents or join a state operated recycling program (RI Statute Ch. 23-24.10, 2008). In addition, this law prohibited residents in the state from disposing of their obsolete electronic devices in landfills and incinerators in the state starting January 31, 2009. Devices that are covered under this legislation include: computers, notebook computers with displays greater than 9 inches, computer monitors and televisions with displays greater than 9 inches. Cell phones, printers, displays that are part of motor vehicles, within home appliances or used in business, industrial and medical devices are excluded from this regulation.

Manufacturers are strongly encouraged by the state to participate in the state run take-back program run by RI Resource Recovery Corporation (RIRRC). Manufacturers must pay a \$5,000 registration fee for each program year starting January 1, 2009 (RI DEM Guidance for Completing Registration Form for Manufacturers, 2012). The program year is equal to a calendar year. Failure of manufacturers to register with the program will result in their devices being prohibited from being sold in the state. Registration in the state goes through the Rhode Island Department of Environmental Management (RIDEM). In addition to this registration, manufacturers that choose to be part of the state program will be required to pay an additional

recycling fee set by RIDEM. Manufacturers that choose to operate their own programs are required to recycle their return share (percentage of all devices collected; television manufacturers not included) or market share (for televisions) of devices sold in the previous program year. Failure to meet these goals could result in fines in the amount that they would have paid to the state if they participated in the state run program. If a non-television manufacturer holds less than 5% of the return share of devices they are required to participate in the state program RI Statute Ch. 23-24.10, 2008).

Fees will help provide free recycling of covered devices from households and schools in the state (RI DEM Electronic Waste, Mar. 2012). Businesses are not covered by the law, thus they are required to make their own arrangements for the proper handling of their obsolete electronics. They are to make sure that any disposal of these items follows the universal waste regulation set by the state and federal government.

Vermont Electronics Recycling

On April 19, 2010 the General Assembly of Vermont enacted Act Number 79 which would provide residents of the state with free recycling of covered electronic devices (CEDs) and at the same time prohibited residents from disposing of these items in Vermont landfills (VT General Assembly Act No. 79, 2010). The Vermont legislation gave manufacturers of covered electronic devices two options for setting up electronic collection and recycling programs in the state. Manufacturers could pay for a standard program run by the state or opt out of the program and implement their own program throughout the state. CEDs in Vermont include: computer, computer monitor, device containing a cathode ray tube, printer or television sold to a covered entity. A covered entity includes any household, charity, school district in the state or

business employing fewer than 10 employees. CEDs do not include household appliances, telephones of any type or video displays included in medical equipment among other items.

As stated above, manufacturers are given the option of working with the state on a standard recycling plan or opting out and forming their own recycling plan in every county of the state. The standard plan requires a secretary from the Vermont Department of Environmental Conservation (VDEC) to evaluate all electronic waste collection opportunities available to residents in the state (VT Standard Plan Summary, Oct. 2012). A determination will be made for each county whether adequate collection opportunities are available. This determination will be made considering the geography, population and population density of each county. If it is determined that opportunities to collect e-waste are not adequate additional collection opportunities may be ordered. Starting January 1, 2011 the standard plan will be implemented to collect all electronic waste from the state. The standard plan requires at least three collection facilities in each county and at least one permanent collection facility in each town with greater than 10,000 residents. Wastes are to be collected from covered entities at no cost (VT E-Cycles, Oct. 2012). Manufacturers may opt out of this plan if they implement similar collection efforts in each county ensuring that collectors and recyclers are fairly compensated for their services.

Regardless if a manufacturer chooses to adopt the standard plan in Vermont or forms their own plan they are required to register with the state by July 1, 2010 unless they sold 20 or fewer CEDs in the state (VT E-cycles, Information for Electronic Manufacturers, Oct. 2012). With the 2010 registration, manufacturers that sold fewer than 100 CEDs were required to pay a \$1,250 registration fee. Manufacturers that sold more than 100 CEDs paid a \$5,000 registration fee in 2010. In addition to the fee, manufacturers are required to submit a registration form with: all brands sold, contact information, if they are opting out (beginning with July 1, 2011

registration), estimate of total weight of items sold in Vermont. The weight of total items sold in Vermont is used to calculate the market share the manufacturer owns. This market share is used to determine the registration fee for 2011 and subsequent years. The registration fee to manufacturers is calculated by multiplying their market share to the cost of administering the collection and recycling program in Vermont and is billed annually in August. Manufacturers that adopt the standard plan will be subject to an implementation fee which is charged quarterly to cover the cost of implementing this collection and recycling plan.

Manufacturers that choose to opt out of the plan must notify the state by March 28 prior to the program year starting July 1 and running until June 30 of the following year. Manufacturers that opt out of the standard plan will be required to submit an annual report by August 1 starting in 2012 and annually after thereafter. The report must contain information on the type of CED collected, total weight collected, recyclers used, the methods used to recycle the devices and any educational or outreach activities performed. If the manufacturer fails to meet their recycling goal through their collection program they will be charged a parity surcharge. The manufacturer recycling goal is calculated by multiplying the state recycling goal by the market share the manufacturer owns. The total weight the manufacturer is deficient in recycling is multiplied by an additional 20% then multiplied by the cost per pound to the state to collect, transport and recycle CEDs.

For the program year of July 1, 2011 – June 30, 2012 the state set a goal to recycle 5.5 pounds of CEDs per capita (VT Statutes Online Title 10 Ch. 116, April 2010). The following program year the goal increases to 6 pounds per capita. For all program years after the first two the goal is calculated based on the average weight collected in the previous two program years multiplied by the goal attainment percentage. The goal attainment percentage is set by the

percentage of the statewide recycling goal collected during the previous calendar year. The goal attainment percentage ranges from 90% to 110% in increments of 5%. Collectors, recyclers and transporters are required to register with the state with no registration fee and have additional reporting requirements. Recyclers are required to report the total weight of electronic waste recycled by August 1st for the program year. Collectors have the same deadline to report the total amount collected in the previous program year and transporters must report the total amount of electronic waste collected and that was not destined for recycling in Vermont.

Washington Electronics Recycling

The state of Washington passed legislation in March of 2006 and went into effect, in part, July 1, 2006 (WA Revised Code Title 70 Ch. 79.95N, March 2006). This legislation required manufacturers to set up collection programs that provided free collection of covered electronic devices to Washington households, charities, school districts, small businesses (less than 50 employees) and small governments (less than 50,000 residents for a city or 125,000 for a county) (WDE E-Cycle Washington FAQ, Oct. 2012). Manufacturers also had the option to participate and fund a standard collection plan run by the state, specifically the Washington materials management and financing authority (WDE E-Cycle Washington, Oct. 2012). Covered devices in this program include: computer monitors and televisions with at least a four inch screen measured diagonally, desktop and laptop computers. Covered devices from manufacturers that are not properly labeled with that manufacturer's name are prohibited from being sold in the state. There is no legislation which prohibits residents from disposing of their electronic items in landfills and incinerators in the state.

All manufacturers that sell covered devices in the state were required to register with the Washington Department of Ecology (WDOE) by January 1, 2007, and annually thereafter (WDE Electronic Products Recycling Program – Ch. 173-900 WAC, Nov. 2007). Manufacturers were required to choose to be part of the standard plan or fully implement their own plan for collection, transportation and recycling of electronic devices by January 1, 2009. Manufacturer registration is required to include a registration or annual renewal fee to cover the administrative costs of the program. Administrative fees are separated into 7 tiers based on the manufacturer's percent market share (WDE Manufacturers 2012 Administrative Fee – Final Tier Schedule, Oct. 2012). The top tier is for market shares of 5% and greater and manufacturers were required to pay a \$41,182 fee in this tier for 2012. Tier 2 market share ranges from 1% - 5% and in 2012 cost \$9,763 for 2012. The fee decreases down the tier schedule with tier 6 for manufacturers with less than 0.01% market share paying an \$8 fee and tier 7 having no fee because the manufacturer had no market share. The fees associated with each tier for the 2012 program declined due to more manufacturers choosing to participate in the standard plan. Manufacturers must also list their name and contact information, brand names of covered devices currently sold in the state, past brands sold, brands the manufacturer has legal authority over, methods of sale in the state and the plan in which they are participating. Individual plans are required to bring in at least 5% of the return share weight of items returned by residents in the state. Detailed information on fair compensation to collectors, processors and recyclers as well as timelines and goals of each independent plan must be spelled out completely. If a manufacturer is running an independent plan and they want to participate in the standard plan they must inform the state five months prior to the start of the next program year.

Each plan requires a statistically significant sampling of the items collected and categorize them by brand, type of product and weight of items collected (WA Revised Code Title 70 Ch. 79.95N, March 2006). This sampling is required to calculate the return share held by each manufacturer. Additionally, the authority running the state program and any manufacturer participating in an independent program are required to submit annual reports by March 1 each year starting in the second program year. The annual report must include total weight of covered items collected by county, collection services available in each county, processors used and weight sent to each processor and educational and promotion efforts that were implemented. Manufacturers are informed of the amount of weight of items that they must have collected during each program year. If they fail to collect the goal set for them the penalty is 45 cents to be paid for each pound under the goal. If the manufacturer collects an excess amount of electronics, the state will pay 45 cents per pound over the excess to the party collecting and recycling devices. Last, collectors, transporters and processors of electronic items are required to register with the state and follow all laws for the best management and handling of these products.

State Run Programs Funded by Residents

California Electronics Recycling

In 2003, California passed an electronic waste recycling act that prohibited covered electronic devices from being sold in California unless the manufacturer complied with the Electronic Waste Recycling Act of 2003 (California SB 20 and SB 50, 2003). The law was amended on September 29, 2004 and was designed to establish a program to encourage consumers to return and recycle or safely dispose of video display devices such as televisions and computer

monitors. These devices are considered hazardous waste by the state when they are disposed based on the Toxicity Characteristic Leaching Procedure and the California Waste Extraction Test. California's program is unique from other states because it requires residents to pay an additional fee when purchasing covered devices, video display devices with screens greater than four inches, to offset the cost of waste recovery, processing and recycling. California also has a ban on the disposal of electronic waste in municipal solid waste because of the presumed hazardous characteristics of the material. The California Department of Toxic Substances Control (DTSC) adopted regulations which allow electronic waste to be classified as universal waste (CA DTSC, Electronic Hazardous Waste, 2012). This designation allows the waste to be transported with relaxed regulations, compared to hazardous waste, and allows the waste to be recycled.

As stated above, California's electronic waste recycling program is funded by consumers when they purchase covered video display devices from retailers (CA DTSC, More Information, 2012). Covered devices include cathode ray tube (CRT) devices, television and computer monitors containing either CRT or liquid crystal displays (LCDs), laptop computers with LCD screens, plasma televisions, or personal portable DVD players with LCD screens. All covered devices must have a screen greater than four inches measured diagonally. Consumers pay a fee that ranges from \$6 to \$10 based on the size of the screen. In 2013, the amount paid by consumers will be reduced to \$3-5 (CalRecycle, Update on Implementation..., Oct. 2012). This fee applies to in person, online or catalog purchases. The money collected by retailers is paid to the California Board of Equalization which, after collecting 3% of the money for administrative costs, deposits the funds into the "Electronic Waste and Recovery and Recycling Account (EWRRRA)." Consumers are able to recycle their old covered devices for free in the state.

Collectors and recyclers are required to register with the state in order to receive funds from EWRRA. Recyclers are defined as, “a person who engages in manual or mechanical separation of covered electronic devices to recover components and commodities contained therein for the purpose of reuse or recycling.” Collectors receive devices from the public and deliver the devices to recyclers for processing (CalRecycle Covered Electronic Waste Recycling Statistics, June 2012). Both groups must report annually the cost handling and processing covered electronic waste to the Department of Resources Recycling and Recovery (CalRecycle). Recyclers are required to submit the weight of covered electronic waste processed within 45 days of the end of a claim reporting month. CalRecycle currently pays \$0.23 per pound to recyclers and \$0.16 per pound to collectors with the funds from EWRRA.

Manufacturers Provide Collection of Electronic Devices and Must Meet a Recycling Goal

Hawaii Electronics Recycling

In July 2008, the state of Hawaii passed legislation which required manufacturers of computers and televisions to implement collection programs for obsolete electronic devices (Hawaii Administrative Rules – Title 11, Chapter 339D: Electronic Waste and Television Recycling Recovery Act, 2009). The law did not require the collection of these devices to be free unless residents brought devices to a central collection site. It also did not include a landfill or incinerator disposal ban. The state defined covered electronic devices (CEDs) as computers, printers, monitors or portable computers with displays greater than four inches diagonally. Televisions are also covered in a separate category with a minimum screen size of nine inches.

Telephones, electronics in household appliances, GPS units and electronics in industrial and medical equipment are not covered under this legislation.

Manufacturers of CEDs may not sell their devices in the state if they were not registered with the Hawaii Department of Health (HDEH) by January 1, 2010 (Hawaii Administrative Rules – Title 11, Chapter 339D, 2009). Manufacturers could register with the state starting January 1, 2009 and a list of registered manufacturers was required to be published by HDEH by April 1, 2009. Retailers are responsible for ensuring the devices sold were from registered manufacturers, failure to do so could lead to fines of at least \$10,000. Manufacturers of CEDs must include a \$5,000 registration fee with their initial registration and \$5,000 with their annual registration renewal. The registration must include a list of all brands sold by the manufacturer. By June 1, 2009 and annually thereafter, manufacturers must submit a plan for collection, transportation and recycling of its covered electronics sold in the state. Plans needed to be fully implemented by January 1, 2010. Manufacturers of CEDs must submit an annual report of the weight of all covered devices collected from the state by March 31 starting in 2011. Manufacturers of CEDs do not have to recycle a minimum weight of electronics.

Manufacturers of televisions were required to register with HDEH (Electronic Device and Television Recycling Law Webpage, Oct. 2012) by January 1, 2010 and pay a \$2,500 registration fee in order to sell their televisions in the state. Renewals of the registration take place on January 1 and have an annual renewal fee of \$2,500. Registrations and renewals must include all the brands sold by the manufacturers and contact information for a representative from the company. By June 1, 2010, and annually thereafter, television manufacturers were required to submit their collection, transportation and recycling program for all covered televisions sold in the state. Last, they must submit annual reports of the total weight of covered televisions

collected and recycled from the state by January 31st starting in 2012. By March 15, 2012 the department would inform television manufacturers their recycling obligation which is based on their market share in the state multiplied by the weight of devices collected in the previous program year. The penalty for failing to meet their recycling goal would be 50 cents per pound for each pound they fail to recycle.

Illinois Electronics Recycling

Illinois's law has been amended to reflect changes as a result of the 2010 program year and includes new technologies that have arisen since the original law was written. The main new device were included tablet computers which have screen sizes greater than 6 inches and does not include portable calculators, portable digital assistants (PDAs) or other specialized devices (ERI – Illinois Legislative Summary, 2012). The Legislature also found that because of this legislation nearly 8,000 jobs were created with \$622 million in annual receipts (IL Public Act 097-0287, 2011).

Illinois passed legislation in 2008 (IL Public Act 095-0959, 2008) for their electronic waste recycling program. The program set forth the recycling goal for 2010 of 2.5 pounds of covered electronic equipment per capita. The population used for this goal was an estimate of the 2009 population by the US Census Bureau. Additionally the state set a goal that 53% of the overall goal be from recycled television and 47% from computers, computer monitors and printers. Individual manufacturers had to report the total weight of televisions they sold in the state between October 1, 2008 and March 31, 2009. The manufacturers would report this value and the state would set the recycling goal for each manufacturer based on their market share.

The market share for computers was calculated based on a formula from the Florida Department of Environmental Protection as it was set on October 5, 2007.

Illinois has several incentives for manufacturers in the state when it comes to meeting their recycling goal. If devices that are collected are refurbished rather than recycled the manufacturer can double the number of pounds that counts toward their recycling goal. If the electronic devices are donated to public education institutions or non-profits that assist low-income children, families or for the developmentally disabled the manufacturer can triple the weight they collected for their recycling goal. Last, manufacturers can double the number of pounds they collect and recycle from “underserved counties” which are listed by the Illinois Environmental Protection Agency (IL EPA Recycling – Electronics Recycling Webpage, 2012).

Manufacturers needed to register for the 2010 program year by November 1, 2009. The registration fee was \$5,000. The fee would be adjusted by inflation in subsequent years. Funds from registration will be dispersed to allow residents to drop off any electronic devices for free with the exception of premium services like curbside pick-up, home pick-up or other similar methods. Manufacturers may not sell any devices in the state of Illinois if they are not registered with the program.

Retailers in Illinois must provide information to consumers on where they can properly recycle their old electronics when they purchase new devices. Recyclers must register with the state by January 1 of the program year and pay a \$2,000 registration fee for 2010 and it is adjusted based on inflation in subsequent years (IL Public Act 095-0959, 2008).

Manufacturers in 2010 did not have to pay a penalty for not meeting their recycling goal. Not meeting their recycling goal would result in financial penalties in 2012. If they do not

meet 60% of their goal for 2012 they will be fined 70 cents the difference between their goal and the actual amount they recycled. Additionally if a manufacturer sold products within Illinois but was not registered with the program they could face a \$10,000 civil penalty for each day that they violated this provision.

Last, the law sets January 1, 2012 as the date that a landfill disposal ban of electronics comes into effect. Additionally these items may not be burned or incinerated as of this date. Groups can file a temporary appeal to this order but it must be reviewed by the Illinois Pollution Control Board.

Minnesota Electronics Recycling

Minnesota's e-waste law was passed in 2007 which required that any manufacturer that was not registered with the state on or after September 1, 2007 could not sell or offer to sell or deliver their devices to retailers (Minnesota Revised Statutes Chapter 115A13. Aug. 2012). If a manufacturer of electronic devices was going to offer a new product for sale after February 1, 2008 they needed to submit information related to the product to the state to ensure it complied with all labeling requirements set forth in the law. As stated earlier manufacturers need to register by September 1, 2007 and the same date each year after. Manufacturers are required to list all the video display devices offered for sale in the state, contact information for the manufacturer and sign off on information that they will comply with the laws of the state.

By September 1, 2008 the manufacturer needed to submit information to the state informing them whether any of their devices sold exceed the maximum content of lead, mercury, cadmium, hexavalent chromium, PBB's, PBDE's as set by the European Parliament and Council in 2002. Manufacturers need to pay a base rate of \$2,500 each year to the program and

are subject to a variable recycling fee based on whether they met their recycling goal for the previous program year. In the first year of the program manufacturers are required to recycle 60%, by weight, of the video display devices that are sold to Minnesota households for the previous year (Minnesota Revised Statutes Chapter 115A13. Aug. 2012). After the first year of the program the recycling goal jumps to 80%. If the manufacture recycles less than 50% of their goal they are required to pay \$0.50 for every pound under the goal they are. If they recycle at least 50% but less than 90% of their goal they have to pay \$0.40 for every pound they are under their goal. If they recycle at least 90% of their goal but not 100% they have to pay an \$0.30 for every pound they are under their goal. Additionally manufacturers can receive a credit for each pound over their goal that they can use in future program years to avoid the variable recycling fee. Recycling credits can be purchased and sold between manufacturers at a price that each manufacturer sets. If a manufacturer sells 100 or fewer video display devices to Minnesota households, they have to pay a \$1,250 registration fee.

Collectors are defined as a person who collects covered electronic devices from households and arranges for the delivery of these devices to recyclers (Minnesota Revised Statutes Chapter 115A13. Aug. 2012). They must register with the state by August 1, 2007 or they will not be permitted to continue collecting these devices. The registration is valid until July 1 of the following year. There is no cost to register as a collector in Minnesota. Retailers do not have to register with the state but are required to provide information on where and how to recycle video display and covered electronic devices.

Recyclers receive covered electronic devices and prepare them for use in manufacturing processes or for recovery of useable materials. Recyclers cannot incinerate covered electronic devices or land dispose the materials. Recyclers had to register with the program by August 1,

2007 in order to recycle these materials and the registration is effective until July 1 of the following year. There is no cost to register with the program but they must comply with all health, environmental, safety and financial responsibility regulations in place. Additionally they must be licensed by all applicable government authorities. They cannot use prison labor and have at least \$1,000,000 in liability insurance for environmental releases, accidents and other emergencies.

Manufacturers must report by September 1 of each year, starting in 2008, the total number and weight of video display devices sold in the previous program year. The weight could be estimated based on national sales data divided by the ratio of Minnesota's population to the national population. Manufacturers can receive a 1.5 times incentive on pounds recycled outside of the 11 county region surrounding Minneapolis and St. Paul (Minnesota Pollution Control Agency, MN Electronics Recycling Act, Aug. 2012). Manufacturers must separate the pounds they recycled from the 11 county metropolitan region and from outside this area. Manufacturers must list the number of recycling credits purchased and sold in the previous program year, the number of credits they possessed for the current year and the number of recycling credits that the manufacturer would use in their registration.

Collectors and recyclers must report by August 1 of each year the number of pounds they collect and recycle. In addition they must list with recycler or collector they delivered the devices for recycling. The law states that if the US EPA sets regulations under RCRA regarding the handling, storage or treatment of the video display devices those laws are effective immediately. The state additionally has the authority to enter a multi-state agreement in order to meet the recycling goal for this law. Last, the law expires if a federal law or combination of federal laws is established to ensure video display devices are recycled and reused.

New Jersey Electronics Recycling

On January 12, 2009 passed the Electronics Waste Management Act (NJ P.L. 2008 Chapter 130). This act required manufacturers of televisions and computers, including desktop, laptop, portable computers and computer monitors to register with the New Jersey Department of Environmental Protection (NJDEP). The law was enacted to ensure free recycling of these covered devices for residents and small businesses in the state at approved collection sites. Additionally, starting January 1, 2011 residents and small businesses were prohibited from disposing of their obsolete computer equipment in their regular solid waste stream. Manufacturers were split into two groups, television and 'other covered device' manufacturers (NJ DEP Letter to Manufacturers of CEDs, 2010), which have resulted in differences in when they are required to register and how their recycling obligation is calculated. Both groups are required to pay a \$5,000 registration fee annually and if the manufacturer works with both groups, they must register and pay the registration fee twice according to a representative with the state (Personal Communication, Oct. 11, 2012).

Starting January 1, 2010, each January 1 thereafter, manufacturers of televisions sold in New Jersey must register with the state and pay a \$5,000 registration fee (NJ DEP Guidance on Complying with E-Waste Law, Aug. 2010). The registration must include a list of brands the manufacturer sells with a report on the number of televisions sold in the state in the previous calendar year. By June of 2010, television manufacturers were required to inform the state their plan for collection and eventual recycling of televisions. The state would calculate the television manufacturers recycling obligation based on the percent market share for the manufacture and a predetermined weight goal. The collection goal for television manufacturers in 2011 was 28.7 million pounds, which is about 3.3 pounds per capita. Starting on January 1, 2011 television

manufacturers were able to start the collection of these devices from residents and count that weight toward their recycling obligation for 2011. Television manufacturers that fail to register with the program or meet their recycling goal will be prohibited from selling their devices in the state. Manufacturers that exceed their recycling goal can receive credits which can be used in the following year to help meet their goal or be sold to other manufacturers to ensure that they meet their goal.

Manufacturers of other Covered Electronic Devices (CEDs) may not sell their items unless it is permanently labeled with the manufacturer's brand (NJ DEP Guidance on Complying with E-Waste Law, Aug. 2010). The NJDEP is required by January 30, 2012, and each following year, to perform a statistically significant sampling of CEDs collected from consumers in New Jersey during the previous program year. The information will identify all brands of CEDs collected and the weight associated with each brand, or the return share weight. By February 1, 2010 and each January 1 following, manufacturers of CEDs must register with the state and pay a \$5,000 registration fee. A CED manufacturer whose return share weight is greater than 0 pounds is required to submit a plan on how they plan to collect and recycle these devices. If the NJDEP determines the CED manufacturers return share is greater than 0 by April 2, 2010 shall submit their plan by June 1, 2010. The NJDEP will make this determination by February 15 starting in 2012. CED manufacturers must submit their collection and recycling plan by March 15 of that year. CED manufacturers will submit an annual report with their registration for the following year detailing the weight of CEDs collected in the previous program year. Failure to meet the goal set by NJDEP will result in a sales ban in New Jersey for the next program year. If the CED manufacture exceeds their goal, they will receive credits which can be used to meet their goal in the next program year or sold to other CED manufacturers.

Retailers are required to provide customers with information on how to recycle their old devices. Additionally, they must check with the NJDEP before selling devices to ensure the manufacturer is in compliance with the Electronic Waste Management Act. The list of compliant manufacturers is provided on the state's e-waste website (NJ DEP E-Cycle New Jersey, Mar. 2012). If the manufacturer is not in compliance with the act, retailers are prohibited from selling these devices.

New York Electronics Recycling

On May 29, 2010 the state of New York passed legislation which required manufacturers to pay for the collection and recycling of most obsolete electronics from consumers (NY Environmental Conservation Law, Article 27, Title 26, May 2010). The law also prohibited businesses from disposing of any electronic items in solid waste landfills starting January 1, 2012. Collectors and recyclers of electronic items were prohibited from disposing of these items as solid waste starting April 1, 2012. Residents will be prohibited from disposing of their obsolete electronic items at any solid waste facility starting January 1, 2015. Until that date the items are to be handled as household hazardous waste with the preferred disposal method being recycling. Devices that are covered by this legislation include: computers, computer peripherals (keyboards, printers, facsimile machines, scanners, mice and cables associated with the peripheral), small electronic equipment (cable boxes, video game console...), small scale servers, cathode ray tubes (CRTs) or televisions with a four inch diagonal display. Telephones of any type, portable digital assistants and electronics contained within household appliances are an example of items that are exempt from coverage under this law.

Beginning April 1, 2011 manufacturers of electronic equipment were required to accept covered electronic equipment for recycling (NY DEC Requirements for Manufacturers of CEDs, Oct. 2012). Collection of items would be free to consumers (NY DEC E-Waste Recycling, Oct. 2012) and manufacturers must accept items from all manufacturers. Equipment collected would count toward the weight goal for each recycler as set by the state. Each manufacturer is responsible for their market share in the state multiplied by the statewide recycling goal. For 2011, the goal was three pounds multiplied by the US Census Bureau's estimate of the state population for 2011. This was then multiplied by $\frac{3}{4}$ because the program year ran from April 1, 2011 to December 31, 2011 rather than a full calendar year (NY Environmental Conservation Law, Article 27, Title 26, May 2010). For 2012, the recycling goal was four pounds multiplied by the population estimate. For the 2013 program year the recycling goal was five pounds multiplied by the estimated population of the state. Beyond 2013 the goal is set by the three year collection average in the state and is then multiplied by the goal attainment percentage which ranges from 90% to 110%. Individual manufacturers that fail to meet their recycling goal must pay a recycling surcharge. This surcharge is tiered based on the percentage of the goal the manufacturer collected. If at least 90% of the goal is met the manufacturer will pay 30 cents per pound they are short of their goal. For collecting at least 50% but less than 90% of the goal, the charge is 40 cents per pound under the goal. If less than 50% of the goal is collected the surcharge is 50 cents per pound under the goal. Starting in 2014 manufacturers will be able to obtain credits for exceeding their individual goal which can be banked for three years, traded or sold on a market. Manufacturers will only be able to obtain credits for only 25% of their recycling obligation.

Manufacturers were required to register with the state starting January 1, 2011. Registration was required to include: \$5,000 contact information for the manufacturer, list of brands manufactured, the manner collection took place, sales data by weight for the previous three calendar years and whether any items exceeded regulations set by the European Union in 2002. Manufacturer collection programs are required to be reasonably convenient for consumers in each county and within each municipality with a population of 10,000 or greater. Methods that can be reasonably convenient include mail back programs, fixed collection sites, community collection events and agreements with local governments, retail outlets or non-profits to collect items on behalf of the manufacturer. Manufacturers are required to submit annual reports starting March 1, 2012, and each year thereafter. Annual reports must contain the total weight of items sold in the state in the previous program year, total weight of items collected and recycled, number of credits obtained or sold and information on the collection program the manufacturer has in place. A \$3,000 reporting fee needs to be included in addition to any recycling surcharge fees that apply to the manufacturer.

Collection, consolidation and recycling facilities in the state must register as well (NY Environmental Conservation Law, Article 27, Title 26, May 2010). Registration for consolidation and recycling facilities must include a one-time \$250 registration fee. Collection sites registration is free. All groups must annually report to the state the amount of electronic scrap collected and recycled from both in state and out of state sources. Retailers are required to sell items only from registered manufacturers and provide citizens with information on how to properly dispose of their obsolete electronic items.

North Carolina Electronics Recycling

The state of North Carolina passed legislation in 2010 which required computer and television manufacturers to set up separate programs to arrange for the collection of obsolete electronic devices from residents of the state (NC SB 887, 2010). The legislation also added discarded computer equipment and televisions to the list of items that are prohibited from disposal in landfills of the state. Computer equipment is defined as any desktop or notebook computer, monitor or other video display device for computers, keyboards, mice and other peripheral equipment for computers. For televisions to qualify for the state program the display needs to measure at least nine inches diagonally. Mobile phones, MP3 players, handheld calculators and displays for medical or industrial equipment are not covered by this legislation (NCDENR Electronics Management Program, Oct. 2012). Manufacturers of computer equipment and televisions were required to register by June 30 of the previous fiscal year for the current program year. Additionally, they must submit annual reports by October 1 detailing the weight of items collected and recycled in the previous program year. Television manufacturers that sell less than 1,000 items in the previous program year are exempt from paying registration fees.

Computer equipment manufacturers that intend to sell their items in the state must submit a registration to the state detailing a program that provides 'free and reasonably convenient recycling' to residents (NCDENR, Electronics Management Program, Information for Computer Equipment Manufacturers. Oct. 2012; NC General Statutes 130A-309.130-141. July 2010). The computer manufacturers must implement recycling programs that fall under one of three levels. Level I recycling plans must include: the manufacturer takes control for items they produce for consumers, direct take-back programs which can be through mail, physical collection sites, or one time collection events, how the plan will be implemented, provide environmentally sound management of devices and provide education for residents on the

program. Level II recycling programs include all the requirements of a Level I recycling program plus: providing for collection of items from other manufacturers, maintain physical collection facilities in the 10 most populated counties of the state and host two additional collection events. Level III recycling programs include all the items from a Level I program and most of the items from a Level II program except the manufacturer must maintain physical collection facilities in 50 counties in the state with 10 being in the most populated counties. Initial registration fees are \$15,000 for manufacturers developing Level I programs, \$10,000 for Level II programs and \$10,000 for Level III recycling programs. Annual renewal fees are \$15,000 for a Level I program, \$7,500 for a Level II program and \$2,500 for a Level III recycling program.

Television manufacturers are required to register with the North Carolina Department of Environment and Natural Resources (NCDENR) and recycle or arrange for recycling their market share of televisions sold in the state (NCDENR, Electronics Management Program, Information for Television Manufacturers. Oct. 2012; NC General Statutes 130A-309.130-141. July 2010). Television manufacturers that sell less than 1,000 devices are required to register but are exempt from paying a registration fee. Otherwise the manufacturer must pay a \$2,500 initial and annual registration fee by June 30 of the previous fiscal year for the upcoming program year. Funds are used to aid local government collection programs to help educate the public and develop markets for recycling. Retailers are responsible for assuring the devices they sell to residents are from manufacturers that are registered with the state.

Pennsylvania Electronics Recycling

Pennsylvania passed The Covered Device Recycling Act 108 in November of 2010 (PA HB NO. 708). The law is a producer responsibility law and partially went into effect on January 1,

2012. The second portion of the law is a landfill disposal ban of electronic devices which goes into effect on January 24, 2013. The law covers desktop and laptop computers, computer peripherals (keyboards, printers, etc.), televisions and other video display devices with screens greater than four inches diagonally. Devices that are part of a motor vehicle, devices within industrial or medical equipment, devices within white goods, any telephone (including mobile phones), personal digital assistant and global positioning devices. Fees manufacturers pay to the state ensure that residents can recycle their waste electronics for free within the state (PA DEP Covered Device Recycling of 2010: A general Overview, Sept. 2011). Manufacturers can charge if they give consumers a coupon or other incentive equal to or greater than the cost of collection of the old electronic device.

Manufacturers, regardless of size, must register with the commonwealth of Pennsylvania by January 1 of each year starting in 2012 (PA DEP Manufacturer Responsibilities Fact Sheet, Sept. 2011). Registration and renewal fees are \$5,000 each year. Manufacturers must include all brands they sell within the state and the total weight of all covered devices they sold nationally during the previous full calendar year. The national sales data is then multiplied by the proportion of Pennsylvania population to the national population to calculate the market share each manufacturer holds. Last, the manufacturer must detail their plan for recycling devices collected from the commonwealth. Manufacturers are not required to recycle a percentage of the weight sold in the previous calendar year; however, the goal each manufacturer sets must increase by at least two percent (2%) each year after the first year.

Manufacturers are required to submit annual reports by January 30 starting in 2013 (PA DEP Manufacturer Responsibilities Fact Sheet, Sept. 2011). The reports need to detail the weight of electronic devices each manufacturer collected and sent for recycling. Manufacturers that fail

to meet the goal they set for the previous program year are subject to fines. The fine is calculated by taking the number of pounds the manufacturer is short of their goal and adding 10% to that number. That number is then multiplied by the estimated cost of collecting and recycling one pound of electronic equipment, regardless of type, to calculate the total amount owed to the Pennsylvania Department of Environmental Protection (PDEP). This fine must be paid by March 15th of the following program year.

Retailers are responsible for ensuring that they only sell devices from manufacturers that are registered with the PDEP (PA DEP Covered Device Recycling of 2010: A general Overview, Sept. 2011). Retailers are not responsible for providing recycling opportunities but they must make the information on where consumers can recycle their old electronic devices available to them. If a retailer does provide collection of electronic devices for recycling to consumers, this collection must be free unless financial incentives are in place that are equal or greater to the cost of collecting, transporting and recycling the device.

Facilities that recycle electronic devices, whether located in or outside of the state of Pennsylvania, must obtain one of three certifications (PA DEP Covered Device Recycling of 2010: A general Overview, Sept. 2011). They must have a R2 (Responsible Recycling Practices Standard) Certification, e-Stewards Certification, or an internationally accredited third-party environmental management standard for safe and responsible handling of covered electronic devices. If the recycling facility is located in Pennsylvania, they must obtain a PDEP general permit prior to processing any electronic devices or electronic waste.

On January 24, 2013, a landfill disposal ban goes into effect for all consumers, businesses and government agencies (PA DEP Electronics Recycling Management Program, Oct.

2012). Consumers must take their devices to an electronics collection location for proper recycling. Businesses need to recycle their devices as well however; they can send the devices to non-certified (R2 or e-Stewards) recyclers. If the recycler is located in Pennsylvania they must have a PDEP general permit. Landfills cannot accept covered electronic devices and must post in a conspicuous location that they will not accept any covered electronic devices. Last, waste haulers may not intentionally accept any covered devices for disposal from any source of waste.

Texas Electronics Recycling

The state of Texas passed legislation on June 12, 2008 which required computer manufacturers to help establish programs for the collection, recycling and reuse of used computer equipment (TAC Title 30, Pt. 1, Ch. 328 Subchapter I, 2008). Computers under this legislation are defined as: a desktop or notebook computer, computer monitors, peripheral equipment such as a keyboard and mouse if they are from the same computer manufacturer. Additional legislation was passed on May 1, 2012 which is still being implemented and requires television manufacturers to develop collection and recycling programs for obsolete televisions (TAC Title 30, Pt. 1, Ch. 328 Subchapter J, 2012). Televisions that are covered by this program have screens that are at least nine inches diagonally. Texas residents are eligible to recycle their obsolete devices for free under these programs (TCEQ Electronics Recycling, Oct. 2012).

The legislation for computer manufacturers went into effect on September 1, 2008. Manufacturers are required to register with the state and implement a recovery plan. The recovery plan needs to be convenient and available to consumers as well as meet the needs of the consumers in the state (TAC Title 30, Pt. 1, Ch. 328 Subchapter I, 2008; TCEQ The Texas Computer-Equipment Recycling Program, Oct. 2012). Programs that can be implemented

include mail back programs, physical collection facilities, or collection events run by manufacturers. The information for each program must be available to consumers on the manufacturer's website. By January 31, 2010 and that date each year after submitting a recovery program, computer manufacturers must submit annual reports detailing the total weight of obsolete computers collected from consumers. Retailers are responsible for ensuring that all computer equipment they sell comes from registered computer manufacturers. The Texas Commission on Environmental Quality will maintain the list and update it as computer manufacturers renew their registration. Consumers in the state are responsible for finding the information on how and where to recycle computer equipment. No party, manufacturers, consumers or retailers, may be charged a fee including recycling or registration fees. Recyclers are required to register with the Texas Commission on Environmental Quality and ensure they follow all state and federal regulations concerning the handling of electronic equipment.

The requirements for the television manufacturers recycling program did not go into effect until July 1, 2012. Manufacturers of televisions are required to submit their recovery plan by January 31, 2013 as well as a \$2,500 registration fee ((TAC Title 30, Pt. 1, Ch. 328 Subchapter J, 2012; TCEQ Television Recycling Program, Oct. 2012). Television manufacturers that fail to register are prohibited from selling their items in Texas. Registration must contain all brands sold by the manufacturer, company contact information, total weight of items sold in the previous program year, and total weight of covered television equipment recycled in the state in the previous program year. Starting with the second year of the program, television manufacturers must recycle a certain weight of covered televisions based on a statewide goal and the market share the manufacturer holds. Manufacturers can join a 'Manufacturer Recycling Leadership Program' which provides at least 200 collection sites or programs

throughout the state. Manufacturers that participate in this program are not subject to registration or renewal fees and they are exempt from reporting requirements. The manufacturers must report to the commission by January 1 their intent to join this program.

Wisconsin Electronics Recycling (WI Act 50, 2009; E-cycle Wisconsin Program Overview, Oct. 2012).

In 2009, Wisconsin passed Senate Bill 107 of Wisconsin Act 50 which required funds for electronic waste recycling to be collected from manufacturers of covered electronic devices. The statute also prohibits the disposal of electronic waste equipment in a waste disposal facility or incinerated after September 1, 2010. Waste that is covered includes: a computer peripheral (such as a keyboard), facsimile machine, a DVD player or digital video player not using a disc nor is a camera, video cassette recorder, video recorder, and a telephone with a video display (WI Act 50, 2009; E-cycle Wisconsin Program Overview, Oct. 2012). Operators at solid waste facilities must make a reasonable effort to separate these devices and recycle them unless separation is not practical or require implementation of procedures to ensure health and safety other than what is in place, or the device is damaged in a way that would prevent practical recycling. Waste disposal facilities must provide information to residents on why it is important to recycle electronic devices and where they can recycle these devices after February 1, 2010.

Waste that is required to be recycled in Wisconsin comes from households or schools in the state. Manufacturers that sell video display devices with a maximum diameter of 7 inches or greater, or manufacturers of computers must register with the program. Starting on February 1, 2010, manufacturers are not permitted to sell a device to a household or school if they are not registered with the state. Manufacturers are also required to register with the state by this date

in the first program year and by September 1 in 2010 and every following year. Manufacturers must provide a list of the covered electronic devices they sell, the name and contact information of a compliance officer with the company, and certification that they comply and will continue to comply with requirements in the law. They must also list which devices comply with the European Union directive on the restriction of hazardous substances in electronic equipment and which devices do not comply with this directive by September 1, 2010.

Manufacturers that sell at least 250 electronic devices in the state must pay a \$5,000 registration fee each year. If they sell less than 250 devices but at least 25 must pay a \$1,250 registration fee annually. If they sell fewer than 25 devices to households there is no registration fee. Manufacturers have a recycling requirement which takes the number of pounds sold to households in the program year that started 36 months prior to the year they are registering. Manufacturers must arrange to recycle 80% of this weight sold. Manufacturers can be charged additional fees if they do not meet this goal each year. If they recycle less than 50% of their goal they must pay 50 cents for each pound they are under their goal. 40 cents per pound under the goal is the rate charged if they recycle at least 50% of their goal but less than 90% of the goal. If they recycle at least 90% of their goal but don't meet their goal they are charged 30 cents per pound they are under the goal. Manufacturers can receive a 1.25 pound incentive for recycling from rural counties as set by this legislation to help meet their recycling requirement.

The first program year only ran half the year. To accommodate this, the legislature halved the recycling requirement in the first program year. Manufacturers can obtain credits for recycling over their goal set by their registration. A manufacturer can obtain credits equal to a pound for pound amount or 20% of their target recycling weight, whichever is less. Credits can be purchased or sold between manufacturers or be retained by the manufacturers for up to 3

years. Manufacturers can be relieved from the additional fee for not meeting their recycling goal by submitting a request for relief with their registration. The manufacturer needs to show that they made a good faith effort to meet this goal.

After January 1, 2010, no person may operate as a collector of electronic devices, which allows them to deliver or arrange for delivery of devices to registered recyclers, without registering with the state. They must renew these registrations no later than August 1, 2010 and that same date each following year. With this registration they must submit an annual report detailing the weight of covered devices they collected and which registered recyclers they delivered these devices to during the program year. Collectors are also prohibited from using prison labor to assist with collection of electronic devices.

Recyclers in Wisconsin are to prepare the eligible electronic devices for use in manufacturing processes or for recovery of usable materials and delivering the materials for use. Recyclers are required to register by January 1, 2010 in the first program year and annually by August 1 following this date. The recyclers must provide contact information for the responsible individuals, the street address of all facilities, and documentation of liability insurance with at least \$1,000,000 for environmental releases. Recyclers must submit a report annually by August 1 starting in 2010. This report must contain the weight of covered electronic devices recycled, collectors that delivered these devices and any manufacturers they are recycling devices on their behalf. They must submit a report beginning February 1, 2011 and each following year the amount of weight recycled and which manufacturers they contracted with for the first 6 months of the program year. Recyclers may not use prison labor to assist with recycling.

Retailers that sell devices to households and schools must give information to consumers on how to recycle their old electronic equipment. This must be listed after July 1, 2010 and can contain the toll free number to contact the state or the state website containing this information. The state must maintain an updated website which contains information on which manufacturers and recyclers are registered with the state. Additional information should be provided to the public on the importance of recycling and where they can recycle their old devices. If a federal law is passed for electronic waste recycling, the state needs to prepare a report on the impact the law will have and submit it to the committee in each house with jurisdiction over solid waste. The state can enter an agreement with other states as well as suspend or revoke the registration of a manufacturer if they violate any provisions of this law. Manufacturers can be fined at most \$10,000 for each violation under this law and any person can be fined at least \$10 but no more than \$1,000 for each violation of this law.

Manufacturer Collection Program Required Only

Maryland Electronics Recycling

In 2007, Maryland passed legislation which required manufacturers to implement take-back programs to collect obsolete electronics from residents in the state (MD HB 488, 2007). During the 2012 legislative session, modifications to this legislation were passed and went into effect October 1, 2012 (MD HB 879, 2012). Manufacturers of covered electronic devices (CEDs) must implement and promote free recycling programs for residents of the state. CEDs are defined as computers or video display devices with a screen that is greater than four inches measured diagonally. CEDs do not include any computer peripherals such as keyboards or printers, or any video display that is part of a household appliance. Although the legislation

encourages manufacturers to promote recycling programs to residents, there is no ban on the disposal of obsolete electronic devices from residents in Maryland landfills and incinerators.

Manufacturers of CEDs are required to register with the Maryland Department of the Environment (MDE) by March 1, 2013, and that date thereafter regardless of the number of devices sold in the state. Manufacturer's registration fees are dependent on the number of devices sold in the state and whether they had an implemented and MDE approved take-back plan in place in the previous calendar year (MDE FAQ Manufacturers, Aug. 2012). Manufacturers that sell fewer than 100 CEDs in the state are not required to pay a registration fee. Initial registration for manufacturers that sell more than 1,000 CEDs and do not have an implemented take-back program is \$10,000. Manufacturers that sell between 100 and 999 CEDs in Maryland in the previous year and do not have a take-back program in place must pay a \$5,000 registration fee. Annual registration renewal fees are the same if the manufacturer does not implement an approved take-back program in the previous calendar year until March 1, 2016. After this date, the registration fee for manufacturers that sell more than 1,000 CEDs in state drops to \$5,000. If a manufacturer implements an approved take-back program in the previous calendar year, their registration fee will be \$500. Manufacturers that fail to register with the state will be prohibited from selling their CED in the state. If the device is sold, manufacturers can face up to a \$50,000 fine and retailers can face up to a \$10,000 fine.

Maryland House Bill 879 states, "That it is the intent of the General Assembly that the annual registration fee collected under § 9-1728(c)(3) of this Act be increased to \$10,000 for a 3-year period beginning March 1, 2013, to provide incentives for manufacturers to implement a covered electronic device takeback program for Maryland returners." Manufacturer take-back programs under this legislation can include mail back programs, permanent collection sites or

contracting with local governments to manage the return of their products. Manufacturers must also include educational and instructional material in the packaging of all new devices on the proper disposal of their old electronic device. Manufacturers are not required to recycle a certain weight of devices sold in the state nor are they required to report whether their program collected any CEDs.

The Maryland Department of the Environment (MDE e-Cycling in MD, Oct. 2012) operates a website which provides a list of collection programs available in several counties in the state as well as a list of manufacturer collection programs for obsolete electronic devices. Funds from registration with the state are used to provide grants for counties and municipalities in the state to assist with the development of collection and recycling in the state (MDE Grants and Other Financial Assistance, Oct. 2012).

Michigan Electronics Recycling

In 2008, the state of Michigan passed legislation which required manufacturers of electronics including computers, computer monitors, printers (starting April 1, 2011), and televisions or video display devices with a screen larger than four inches diagonally to register with the Michigan Department of Environmental Quality (MDEQ) (Michigan Natural Resources and Environmental Protection Act 451 of 1994, Part 173 – Electronics, 2009). Recyclers of these covered devices are also required to register with the MDEQ and pay a registration fee. Michigan passed the legislation due to concerns from residents about electronic waste being exported to economically disadvantaged countries, according to a representative with the state (Personal Communication, Oct. 2, 2012). Additionally, Dell approached the legislature to introduce the bill and it was passed even though concerns existed about a lack of funding for

recycling and manufacturers were not held to set targets for recycling each year. There is no ban for residents of Michigan from disposing of their electronic waste in their municipal solid waste. However, this legislation allows residents of the state to drop off up to 7 covered electronic devices (CEDs) a day for free (MDEQ Electronics Takeback Program, Oct. 2012).

Manufacturers are required to register with the MDEQ and pay a \$3,000 annual registration fee by October 30th starting in 2009 (MDEQ Part 173, Electronics, of 1994 PA 451 as amended FAQ, Sept. 2009). Registration with the program must include a list of brands offered for sale and information about take back programs offered to residents in the state. Following the initial registration by the manufacturer, they must include a report on the total weight of CEDs collected through their take back program with their registration. The registration is valid until October 30 of each year. Manufacturers of covered video display devices had a non-binding recycling target of 60% of the weight of total devices sold in Michigan during the previous fiscal year. If manufacturers are not registered with the state, retailers are prohibited from selling the manufacturers new devices starting April 1, 2010. Computer and video display device manufacturers were also required to have their take back program in place and implemented by April 1, 2010. Computer manufacturers take back programs require the manufacturer to take back only the brands they sold in the state. Television take back programs require manufacturers to accept any brand of television or video display device.

In addition to manufacturers registering with the state, individuals or companies that recycle covered computers and video display devices are required to register with the MDEQ as well. Recyclers are defined as a, “person who as a principal component of a business acquires covered electronic devices and sorts and processes the covered electronic devices to facilitate recycling or resource recovery techniques” (Michigan Natural Resources and Environmental

Protection Act 451 of 1994, Part 173 – Electronics, 2009). Recyclers are required to register by October 30 each year starting in 2009. Registration is to include the name, address and phone number of all recycling facilities under direct control of the recycler in the state. A \$2,000 annual registration fee must be included as well as assurance that the recycler will meet all state requirements to act as an electronics recycler. Registrations in 2010 and beyond must include a total weight of covered electronics recycled during the previous fiscal year.

Missouri Electronics Recycling

In 2008, the state of Missouri passed the “Manufacturer Responsibility and Consumer Convenience Equipment Collection and Recovery Act (Missouri Revised Statutes, Section 260.1050 to 260.1101).” This act required computer manufacturers to implement recovery plans for collecting and recycling or reusing covered computer equipment at no additional cost to households or businesses. Households are encouraged to recycle or donate their waste computer equipment but there are no regulations prohibiting the disposal of these devices in Missouri landfills.

Manufacturers of desktop, laptop or notebook computers are required to register with the state of Missouri’s Department of Natural Resources (DNR). Covered equipment includes the three computer types mentioned above as well as video displays or computer monitors greater than four inches measured diagonally, the accompanying keyboard and mouse from that computer manufacturer. There is no cost to manufacturers to register with the program but, manufacturers that are not registered and have provided the Missouri DNR with a recovery plan cannot sell their devices in the state. The law and DNR Electronic Scrap Management rules (10 CSR 25-19.010) does not apply to televisions, devices that are part of any motor vehicle,

typewriters, calculators, personal digital assistants, printers or telephones including mobile phones. Manufacturers are required to submit a written recovery plan to the DNR which includes how and where consumers can recycle their equipment and provide this information to consumers on their website. Additionally, they must report the weight of covered devices collected and recycled or reused each year by January 31. Manufacturers can implement a mail-back program where consumers do not have to pay for shipping, a direct pick-up program from consumers, a physical collection site in towns with at least 10,000 residents, collection events in towns with at least 5,000 residents, or designate a facility or retailer to collect devices within a 30 mile radius of where the device was sold.

Recyclers that choose to contract with manufacturers for this law are required to follow one of two standards for handling electronic waste (e-cycle Missouri. Register Your Business, Oct. 2012). They must follow the Electronics Recycling Operation Practices set by the board of directors at the Institute of Scrap Recycling Industries (IRSI) or the Responsible Recycling (R2) Practices for Use In Accredited Certification Programs issued by the US Environmental Protection Agency. If the recycler chooses to not be involved with the program in Missouri, they do not have an obligation to either standard. Whether they are involved with the program or not, recyclers must follow all laws and regulations and may be subject to inspection. Recyclers can register with the Missouri DNR's Tiered Voluntary Registration Program. The program has four registration levels with increasing regulation for the business to follow. Registered recyclers will be listed on the DNR's website with what tier they are registered to allow consumers to choose a recycler that meets their needs.

Businesses, non-profits, schools and public agencies are subject to tougher regulations concerning waste electronics (MO DNR Hazardous Waste Program Fact Sheet). Businesses are

prohibited from disposing their electronic devices in Missouri landfills. Businesses are encouraged to reuse or recycle their old televisions. If they do not choose to recycle these devices they must be treated as hazardous waste and are required to follow all local, state and federal hazardous waste laws and regulations.

Oklahoma Electronics Recycling

In 2008, Oklahoma passed enrolled Senate Bill Number 1631, creating the Oklahoma Computer Equipment Recovery Act. This law is an extended producer responsibility law and went into effect January 1, 2009. The act required all manufacturers that sold at least 50 computer devices to implement a recovery plan for refurbishing or recycling these devices. Manufacturers can work alone to recover these devices or cooperate with other manufacturers to recover these devices. These recycling programs must explain how the devices would be recovered from the consumer at no cost. Manufacturers must sign an agreement that states they will not dispose of the covered devices in a landfill or transfer the devices to a recycler that would dispose of the devices in a landfill other than in incidental amounts. This legislation was sponsored by the computer industry with Dell being a primary sponsor according to a representative (Personal Communication, Oct. 1, 2012) from the Oklahoma Department of Environmental Quality (DEQ). This representative also stated that there was little, if any, opposition to the law and there are no concerns about the legislation that they are aware of.

By March 1 of each year, manufacturers are required to submit a report to the state detailing their recovery program, the weight of covered devices collected and recovered (refurbished or recycled) during the previous calendar year, location and dates of collection events or collection sites, and certification that the devices were collected in a manner that was

complaint with all federal, state and local laws (OK Enrolled SB NO. 1631, May 2008). Covered devices in this law only include desktop or notebook computers or computer monitors. Televisions, any part of a motor vehicle, a personal digital assistant, telephone or medical devices that have video displays are not covered devices in this law.

Manufacturers are divided into two categories by the state (OK Administrative Code Title 252:515-39-2). Major Manufacturers are manufacturers that produce, sells or imports 1,000 or more devices per calendar year. Minor manufacturers produce, sell or import more than 50 but less than 1,000 covered devices per year. Major manufacturers must pay an annual fee of \$5,000 to the state whereas minor manufacturers pay a \$1,000 annual fee. If either group fails to pay their fee on time they are assessed a \$500 late fee, as set out in Title 252.515-39-4. Annual fees are due March 1st each year. Annual fees are automatically adjusted July 1 each year based on the percentage increase in the Consumer Price Index. The increase in fees can be waived by the DEQ. The fees are used to support the program and automatic increases are in place to assist with increasing price of implementation of the program. Failure of manufacturers to comply with the requirements of this law can result in a \$1,000 penalty on the first violation and a \$5,000 penalty for the second and subsequent violations. Representatives from the state have said that they have not had issues with compliance since the program has been in place and have not sent any manufacturers to enforcement (Personal Communication, Oct. 1, 2012). The only issues that could arise are sending in annual reports on time and they are usually resolved once reminders are sent out.

Manufacturers must be registered with the program to sell their computer devices within the state of Oklahoma. If a manufacturer is not registered with the DEQ they may not contract with a state agency for the purchase or lease of any covered device. Manufacturers are

not required to meet a recycling goal thus state representatives feel there would be little reason for manufacturers to falsely report the weight of covered devices recycled (Personal Communication, Oct. 1, 2012). Manufacturers are required to inform consumers about the program and how they can recycle old devices. The DEQ maintains a website with information on which companies are in compliance with the law as well as recycling locations and events that consumers can drop off their devices (ODEQ Computer Equipment Recycling, July 2012). There is no landfill disposal ban for residents of the state and they are not required to participate in the program by recycling old devices.

South Carolina Electronics Recycling

The state of South Carolina passed legislation in May 2010 that requires manufacturers of computer, printer and television to provide recovery programs for these devices (SC Legislature Code of Laws, Title 48 Ch. 60, 2010). The legislation went into effect on July 1, 2011. Manufacturers were required to provide comprehensive and convenient recovery programs at no cost to residents. Devices covered under this program include any computers, computer monitors, printers marketed to consumers or televisions with a viewable screen of at least nine inches. Cell phones, household appliances and motor vehicles that contained video displays or medical equipment with video displays are not included in this law. In addition, the legislation prohibits consumers from disposing of their obsolete electronic devices in landfills in the state of South Carolina.

Computer manufacturers are required to register with the state by July 1 starting in 2011 and annually thereafter (SC DHEC E-Cycle South Carolina, Jan. 2012; SC Legislature Code of Laws, Title 48 Ch. 60, 2010). Failure to register will prohibit the computer manufacturer from

selling their device in the state. Computer manufacturers must offer recovery programs that either enable consumers to mail any end of life computer device to the manufacturer for reuse, recycling or refurbishment. If mail-back programs are unavailable, collection sites or collection events should be made available to consumers with the number of sites or events depending on the size and population of the county, region or other locations taken into account. Computer manufacturers may work in cooperation with each other to set up collection events or use existing retailers, recyclers and reuse organizations to serve as their collection center. Manufacturers must publish collection information on their website for consumers to find these events. There are currently no fees in place for computer manufacturers to register with the state. Legislation was proposed in 2012 which set the rates for registering based on the number of devices sold however; this was permanently withdrawn from the legislature (SC Legislature Act 4179, 2012).

Television manufacturers must be registered and have recovery and recycling programs in place by July 1, 2011 (SC DHEC E-Cycle South Carolina, Jan. 2012; SC Legislature Code of Laws, Title 48 Ch. 60, 2010). Failure to register will prohibit television manufacturers from being able to sell their devices in the state. Television manufacturers have a recycling goal which goes into effect for the 2012 program year which runs July 1, 2012 to June 30, 2013. The recycling goal is calculated by the market share the television manufacturer has in the state multiplied by the number of pounds of televisions recycled by all manufacturers in the previous program year. The market share is calculated by taking the total weight of televisions sold in the previous program year nationwide and multiplying it by the proportion of South Carolina's population to the population of the United States. There are no registration fees currently for television manufacturers nor are their fees for failing to meet the recycling goal. This was set in proposed

legislation in 2012 but the bill was permanently withdrawn from consideration (SC Legislature Act 4179, 2012). Registration fees were on a graded scale based on market share and shortfall fees were graded based on the percentage of the recycling goal recovered.

Virginia Electronics Recycling

In 2008, the Virginia legislature passed “Virginia’s Computer Recovery and Recycling Act” (Code of VA Section 10.1-1425.27-38, 2008) This legislation required computer manufacturers that sold at least 500 devices in the commonwealth to implement recovery programs for that was free for residents to use. Television manufacturers are excluded from this law. Manufacturers of computers and computer monitors were required to register with the state and have their recovery plan implemented by July 1, 2009. Failure to register would result in their devices being prohibited from being sold in the state. There are no prohibitions in place for residents wishing to dispose of their electronic waste in landfills in Virginia. The Virginia Department of Environmental Quality (VDEQ) is currently working with EPA Region III and examining if a disposal prohibition would be needed in the future (VA DEQ E-Waste Management Interim Recommendations, Oct. 2012).

Manufacturers are required to provide their recycling plan to the VDEQ. The plan must be reasonably convenient and available to consumers in the commonwealth (VA DEQ Computer and Electronics Recycling Webpage, Oct. 2012). Collection systems can be mail back programs, physical collection sites run by the manufacturer or designated by the manufacturer to collect on their behalf, or collection events (VA DEQ, Virginia’s Computer Recovery and Recycling Act Webpage, Oct. 2012). The collection information must be available on the manufacturer’s website as well as VDEQ’s website. Manufacturers are required to publish a report containing

the name and contact information of the person responsible for their recovery program, weight of computer equipment collected and recycled in the previous calendar year, and documentation stating equipment was handled in an environmentally sound fashion. This report must be published by January 31 annually. Manufacturers are not required to recycle a certain weight of covered computers. There is no registration or recycling fees for manufacturers registering with the state. Retailers are responsible for ensuring equipment they are selling is coming from registered and compliant manufacturers.

West Virginia Electronics Recycling

On March 8, 2008 the West Virginia legislature passed Senate Bill No. 746. This bill required manufacturers to register with the state and implement a program which allows residents to recycle their obsolete covered electronic devices (CEDs) for free. Manufacturers would need to register with the program by January 1, 2009. The state defined CEDs as a television, computer or video display device with a screen that measures greater than four inches diagonally including mobile phones (Personal Communication, Oct. 16-17, 2012; WV SB No. 746, 2008). CEDs do not include video display devices contained within motor vehicles or what is contained within a household appliance or commercial, industrial or medical equipment. On March 13, 2010 Senate Bill No. 398 was passed and prohibited residents from disposing of CEDs in West Virginia landfills. The disposal ban went into effect on January 1, 2011 (WV SB No. 398, 2010).

Under the “Covered Electronic Devices Takeback Program” manufacturers that sell an average of more than 1,000 CEDs in the previous three years are required to register with the state of West Virginia (WV Title 33 Legislative Rule Series 11, April, 2010). Manufacturer

registration fees vary based on whether they have an approved collection program and whether the registration is a renewal or initial registration. Manufacturers that do not have an implemented and approved program will pay a \$10,000 registration fee with their initial year and \$5,000 in subsequent years (WVDEP CED Manufacturer Registration and Takeback Program, Oct. 2012). Manufacturers that do have an implemented and approved take back program will pay \$3,000 to register in the first year and \$500 in subsequent years. All registration fees are due by January 1 for that program year which starts January 1 and end December 31. Take back and collection programs implemented by manufacturers must enable residents to drop off their CEDs at no cost to the consumer. Manufacturers with approved recovery programs are required to report the total weight received and recycled from the state in the previous year by February 15th. Fees collected from manufacturers are placed in the Covered Device Takeback Fund. This fund is used to provide grants of up to \$40,000 to municipalities, county commissions or county solid waste authorities to help set up the collection of CEDs (E-Waste West Virginia, Oct. 2012). Manufacturers are not required to meet a recycling goal. Representatives from the state are considering making changes to the law to set some sort of minimum recycling requirement in order to make manufacturers more inclined to promote their programs to residents.

States with Special Legislation

Colorado Electronics Recycling

On April 20, 2012 Colorado Governor, John Hickenlooper, signed the Electronic Recycling Jobs Act (CO SB 12-133). Beginning on July 1, 2013 a person may not dispose of an electronic device or a component of the device in a landfill in Colorado. Exemptions can be made if a board of county commissioners applies for a two year exemption. They may only apply

for this exemption if there are not at least two electronic waste recycling events per year or an ongoing electronic waste recycling program that serves the county. The commissioners in the county should make a 'good faith effort' to secure electronic waste recycling services before the two year exemption can be made. A majority vote by the county commissioners is required for this exemption. Once the two years passes the county may apply for an exemption, but they must make another effort to find an electronic waste recycling vendor.

Counties are not required to pay for the recycling services and are encouraged to work with the Colorado Department of Public Health and Environment or other organizations such as the Colorado Association for Recycling to find a vendor to serve the county. Recyclers are not liable for personal or financial information that a consumer or state agency leaves on the electronic device that is collected, processed or recycled unless the recycler was grossly negligent. Waste haulers and landfill owners and operators are not in violation of this law if they make a good faith effort to divert electronic waste from landfills. The Department of Public Health and Environment are designated with working with current public and private efforts to educate the public about the benefits of electronic recycling and how to find an electronic recycler (CO SB 12-133).

Electronic devices that are included in this law include: computers, peripherals (keyboards, printers, etc.), digital video disc player, video cassette recorder or video display devices or computer monitors that are greater than four inches diagonally including electronic books and tablet computers. Devices that are part of motor vehicles, in industrial processes, within white goods or part of a telephone are excluded from the law (CO SB 12-133).

Manufacturers, recyclers and collectors are not required to register with the state or provide any data on sales or recycling. There are no penalties listed in the law if the legislation is violated as well. A source with the Colorado Department of Public Health and Environment told me that regulations are still being drafted with stakeholders related to this law.

This law expands the groups that are prohibited from disposing of electronics in landfills. For several years industry, business, government agencies, institutions and schools were prohibited from disposing of electronic waste in municipal solid waste landfills. The ban was in place for items that exhibited one of more characteristics of hazardous waste. The state recommends that all consumers in the state recycle their electronic waste and buy products that are refurbished to reduce the amount of waste produced from old products (Personal Communication, Oct. 3, 2012).

Massachusetts Electronics Recycling

The commonwealth of Massachusetts does not have a law in place which requires manufacturers to set up recycling programs for residents of the state. The commonwealth also has a very limited disposal restriction for all residents. Residents are prohibited from disposing of cathode ray tube devices in landfills and incinerators in the commonwealth (MassDEP 310 CMR 19.017; Waste Disposal Regulations, Dec. 2012; MassDEP CRT Reuse & Recycling, Oct. 2012). This restriction went into place on April 1, 2000. The Massachusetts Department of Environmental Protection (MassDEP Electronics Recycling, Oct. 2012) encourages residents to consider donating unwanted electronic items to organizations such as Goodwill Industries or Charity America to extend the useful life of the item. The department asks residents to send any non-working items to recyclers to prevent future environmental contamination from lead,

mercury and other toxins contained in the electronic equipment. MassDEP provides a list of manufacturers that operate mail-back or take-back programs for electronics as well as links to outside organizations that wish to educate the public on where to recycle these items and the dangers associated with each item (Electronics Recycling Website, Oct. 2012).

Montana Electronics Recycling

The state of Montana does not have legislation which requires residents to recycle their obsolete electronic products or bans residents from disposing of these items in Montana landfills. The Montana Department of Environmental Quality's (MDEQ) website describing the importance of recycling electronics says that the decision to not ban these materials was due to the distance Montana is from most markets for recyclables (MDEQ e-rase your e-waste!, July, 2011). In 2007, the Montana legislature passed the "Statewide Household Hazardous Waste Public Education Program" (MT HB 555, 2007). The legislation required the MDEQ to implement a program which would provide information on alternative disposal options for household hazardous waste (HHW), options for recycling or safe disposal of electronic waste, recycling or reusing HHW and alternative uses for products that lead to the generation of HHW. The MDEQ maintains a website which provides residents with information on the importance of recycling (MDEQ "Why Recycle Electronics, June 2011). This website lists the hazardous components of computers and excerpts from the Basel Convention's 2009 Press Advisory which states the trends in electronic waste generation. Residents can find information on where electronics are collected for recycling as well as information on manufacturer take-back programs. Information on the proper disposal of Compact Fluorescent Lights (CFLs) and batteries as well as a list of frequently asked questions can be found on this website. Last, the MDEQ provides software to

residents to clear the data contained on their electronic devices to ensure confidentiality upon disposal of the item.

New Hampshire Electronics Recycling

The state of New Hampshire does not have legislation in place which requires residents to recycle their obsolete electronic equipment. Legislation was proposed in 2008 (N.H. H.B. 1584, 2008) which was originally a product stewardship bill but eventually turned into a study committee (personal communication, Oct 30, 2012). The study committee recommended greater permitting requirements for e-waste collection and recycling facilities (N.H. Commission to Study the Recycling and Disposal of Electronic Waste, Report 2008). The report also called for increasing the frequency permitted e-waste facilities had to pay fees but did not recommend the implementation of a state electronics recycling program. Legislation was passed on May 24, 2006 which prohibited residents from disposing of their video display devices with viewing area four inches or larger in New Hampshire solid waste landfills or incinerators (N.H. H.B. 1455-FN-A, 2006). The disposal ban went into effect on July 1, 2007. Additionally, the legislation requires the New Hampshire Department of Environmental Services to monitor regional programs which help finance electronics recycling and report the results of each program to committees in the state house and senate. Residents of the state are encouraged to recycle or reuse their obsolete electronic equipment (NHDES Pollution Prevention Program). The state estimated that about 95% of obsolete electronic devices were heading to disposal rather than for recycling or refurbishment (NHDES Managing Waste Electronics, 2012). Links to outside organizations are available to residents to assist them in learning about the hazards of this waste stream and where they can find a recycler for their electronics. One organization that is included in the links is the Northeast Recycling Council which provides information on all environmental issues in the

state as well as projects and topics that are important for future development

(<http://www.nrec.org/index.html>).

Utah Electronics Recycling

In 2011 the Utah legislature passed Senate Bill No. 184 which established the “Disposal of Electronic Waste Program.” This program required manufacturers of computers, computer peripherals, televisions and television peripherals to implement a collection public education program for the proper disposal of these electronic items (UT S.B. No. 184, 2011).

Manufacturers that fail to meet these requirements are not permitted to sell their devices in the state. Additionally, the law allows local governments to enter into arrangements with manufacturers to set up collection programs for electronic devices. Manufacturers are required to submit reports by August 1 each year detailing their program or system for collection, transportation, reuse or recycling services available to consumers for their electronic devices (Utah’s Disposal of Electronic Waste (S.B. 184) Legislation Summary, Oct. 2012). Failure to implement and report a collection program can cause a manufacturer to be prohibited from selling their electronic devices in the state. The collection program does not need to free to consumers and manufacturers are not required to meet a collection goal. The Utah Department of Environmental Quality has set up a webpage providing residents with information on how they can recycle their obsolete electronics responsibly (UDEQ Recycling Electronics Responsibly, Oct. 2012). This website contains information on the hazards associated with electronic waste and lists several electronics recyclers residents can use for the responsible disposal of their old electronics. Last, there is no prohibition on the disposal of electronic items in landfills or incinerators in the state of Utah.

States without Electronic Recycling Legislation

This section of the paper contains the final 21 states that have not have passed electronic waste legislation. This group is broken down into three subcategories. The first is states that had legislation proposed in the past. Summaries will analyze the proposed legislation and, if the information is available, why these pieces of legislation did not pass. The second subcategory will contain states that passed legislation to form study committees to analyze whether implementing electronic waste legislation in the state would be feasible. The last subcategory will contain states that either did not attempt electronics recycling legislation or the proposed law was not provided for this paper.

States that Proposed Legislation

Arizona Electronics Recycling

Arizona does not have an electronic waste recycling law in place nor is this waste prohibited from being disposed in landfills. The Arizona Department of Environmental Quality does not have a webpage set aside for electronic waste recycling but links are provided on the recycling page (<http://www.azdeq.gov/environ/waste/solid/recycle.html>). Residents are encouraged to use Earth911.com (which leads to www.azrecycles.gov) or a state managed recycling locator which can break down what type of electronic material can be recycled where the resident lives. The state also provides a link to the EPA eCycling webpage (<http://www.epa.gov/epawaste/conserve/materials/ecycling/index.htm>) to give information on the importance of recycling electronic waste. An electronic waste recycling program was proposed in the Arizona House of Representatives (49th Legislature, 2nd Regular Session, 2010,

HB 2614). This law was a producer responsibility law that modeled the law in place in Oregon. The law would ban the improper disposal of electronic waste January 1, 2013 and run until 2020. The bill was withdrawn from consideration a few weeks after it was introduced (Electronics TakeBack Coalition). Communication (Oct. 30, 2012) with a representative from the Arizona Department of Environmental Quality stated that HB 2614 is just one of a series of five bills proposed from 2008 to 2012. The bills differ slightly on a manufacturer electronic recycling program, but every time the bill was held in its assigned committees (AZ State Legislature Bill Status Overview – HB 2209, HB 2425, HB 2614, HB 2194, HB 2520).

Florida Electronics Recycling

The state of Florida does not have a law in place which requires residents in the state to recycle their waste electronic devices. Additionally, there is no law in place that prohibits residents from disposing their old electronics in landfills and incinerators in Florida. The Florida Department of Environmental Protection (FDEP) strongly encourages residents in the state to either donate their electronics or send them to a recycler for proper end of life management (FDEP Regulatory Guidelines for Management of Unwanted Electronics, June 2008). The FDEP's website (<http://www.dep.state.fl.us/waste/categories/electronics/default.htm>) provides links for residents in the state to find a location to drop off their electronic scrap as well as links which provide residents with information on why donating or recycling their products is important. The FDEP has also provided grants to 23 counties in the state to “establish infrastructure to collect and transport lead-containing materials to Florida-based recycling businesses (Section 403.71851, F.S).” Businesses in the state are required to treat their electronics as hazardous waste unless they are recycled or they pass the Toxicity Characteristic Leaching Procedure (TCLP). Cathode Ray Tube devices are considered hazardous waste unless

they are properly recycled (FDEP Regulatory Guidelines for Management Of Unwanted Electronics, June 2008).

Although the state of Florida does not have a law requiring households to recycle their waste electronics, there was an attempt in 2003 to pass a law to encourage recycling of these devices. In 2002 a Florida Senator requested the FDEP to draft product stewardship legislation for introduction in the 2003 legislative session (Personal Communication, Oct. 15, 2012). Florida Senate Bills 674 and 678 were never introduced due to a lack of sponsorship in the House. SB 674 would establish an advanced recycling fee, where consumers would pay \$10 for each product they purchased (FDEP Draft Bill Analysis SB 674, 2003; FL SB 674, 2003). The funds collected would be placed into an electronic recycling account, established in the Solid Waste Management Trust Fund by SB 678 (FDEP, Draft Bill Analysis SB 678, 2003; FL SB 678, 2003). The funds would be used to establish collection and recycling programs in every county in the state. The law would prohibit residents from disposing their electronic in landfills or incinerators on January 1, 2004 in counties with populations greater than 100,000 and January 1, 2006 for every other county. Residents would be able to recycle their electronics for free under this legislation and manufacturers would be encouraged to establish collection programs that all residents could use. Last, a waste surcharge would be imposed in each county to help pay the cost of collection and recycling.

Idaho Electronics Recycling

The state of Idaho does not have a law in place that requires residents to recycle their electronics at the end of their life. Additionally, residents are not prohibited from disposing of their electronics in landfills in Idaho. Although there are no laws in place that prohibit the

disposal or require recycling of waste electronics, Idaho has tried several times to pass legislation (Personal Communication, Oct. 11, 2012). The Idaho Department of Environmental Quality (IDEQ) does encourage recycling of obsolete electronic devices and has a recycling directory on their website listing companies and local governments the reuse and/or recycle electronic waste. A source (Personal Communication, Oct. 11, 2012) with IDEQ said that many residents in the state understand the importance of recycling and reusing these devices. However, the state is very rural so the cost to collect, transport and reuse or recycle can be higher than it is in more populated states. Last, they noted that several cities and counties are implementing e-waste collection programs that are funded by the solid waste programs in that jurisdiction. Businesses that generate electronic waste need to make a hazardous waste determination on the products before the product can be disposed (IDEQ Solid Waste Website, Oct. 2012). If the product is determined to be hazardous waste it must be managed in accordance with hazardous waste regulations in Idaho. If the waste is recycled or reused, businesses are not required to manage it as hazardous waste.

As stated above, Idaho has had several attempts to prohibit the disposal of electronic waste or require recycling of e-waste. In 2004, an amendment to the Idaho Solid Waste Management Act was proposed that would ban the disposal of electronic waste in municipal solid waste landfills. The bill was pulled during committee review because Idaho did not have the infrastructure in place to deal with all the e-waste previously disposed in landfills (Personal Communication, Oct. 11, 2012). Although this amendment was pulled, a committee was formed to look into solutions for electronic waste issues. The committee met several times but decided not to move forward with legislation because of activities by groups such as the National Electronic Product Stewardship Initiative according to a representative with IDEQ. In 2007 and

2008, two different pieces of legislation were drafted by a state representative and reviewed by IDEQ. In 2007, the legislation was modeled after the law in place in the state of Washington; 2008's legislation was modeled after the law in Oregon. Because of the economic recession that was occurring, neither draft was introduced in the legislature.

Nebraska Electronics Recycling

The state of Nebraska does not currently have a mandatory electronic waste program in place that requires recycling of electronic waste. Additionally, there are no laws in place that prohibit residents from disposing of their waste electronics in state landfills. Commercial activities that dispose of high amounts of electronic waste may be prohibited depending on the composition of the waste which could classify the electronics as hazardous waste. A source (Personal Communication, Oct. 2, 2012) within the state of Nebraska stated that multiple bills were introduced in the state legislature that would implement an electronic waste recycling program but the majority of these failed to make it out of the legislature. One bill did pass the legislature but was vetoed in 2008. The source choose not state why bills failed to pass the legislature or was vetoed.

Nebraska Legislative Bill 644 was the last e-waste legislation introduced in the state in 2009 and the act was indefinitely postponed in April 2009 (NE LB 644 Electronics Recycling Act. The legislation would have covered computers, computer monitors, video display devices and televisions (displays greater than 4" diagonally). Registration fees were tiered based on the number of devices sold in that state in the previous year with 500 devices sold as the minimum amount required for registration. Registration fees were \$1,000 for selling 500 – 1,000 devices, \$7,500 for selling 1,000 – 5,000 devices, and \$20,000 for selling 5,000 or more covered devices.

The fees could be reduced if the manufacturer showed that they recycled a percentage of the number of devices sold.

The Nebraska Department of Environmental Quality (NDEQ) encourages households to recycle waste electronics but these devices are not classified as hazardous waste. When electronic items exhibit hazardous waste characteristics the state recommends six management options: reuse/keep in continued use, send to an electronics recycler, dispose to a municipal solid waste landfill (only applies to households and conditionally exempt small quantity generators), send for refurbishment, manage as universal waste, or manage as a hazardous waste (NDEQ Guidance Document: Waste Computers..., Jan. 2009). The state notes that recycling these devices can allow people disposing of large quantities of electronic waste to avoid having to manage the waste as universal or hazardous.

New Mexico Electronics Recycling

The state of New Mexico does not have a law in place that requires residents to recycle their obsolete electronic equipment nor is there a ban on the disposal of these items in New Mexico landfills and incinerators. The New Mexico Environment Department's Solid Waste Bureau manages a website (NMED Electronics Recycling and Reuse, Jan. 2012) providing residents, state agencies and businesses with information on how to handle obsolete electronic devices. Recyclers of electronic devices in the state are required to register with the Solid Waste Bureau and are encouraged to follow Responsible Recycling (R2) practices (NMED Guidance on Registration for Electronic Scrap Recyclers, Feb. 2009). Residents are given information on how and where to recycle televisions and other electronic scrap. State agencies have information on the rules in place on how to purchase and dispose of their electronic items. Last, links are

provided to outside organizations that can provide additional information on recycling and reuse of electronic devices.

There have been a couple bills passed by the New Mexico Senate, Senate Joint Memorials 9 and 11, which required the New Mexico Environment Department (NMED) to examine the possibility of implementing electronic recycling legislation. A source with the NMED said that these bills were aimed more toward the handling of electronics by the state relating to purchasing and disposing of the items (Personal Communication, Oct. 24, 2012). They also stated that a few years ago a bill sponsored by Dell was introduced in the state legislature but was tabled soon after they were introduced. Residents are asked to handle their obsolete electronics as household hazardous waste but they can be disposed in landfills if the operators accept them. Cathode ray tube devices are to be recycled but many are shipped to Mexico because it is believed that demand for these items is high. Businesses that have CRTs are more likely to recycle them since that option is much cheaper than handling the items as hazardous waste.

Ohio Electronics Recycling

Ohio does not have legislation which requires residents of the state to recycle their electronic waste. There are no regulations in place which prohibit residents from disposing of these items in landfills in the state. Although there is no law in place representatives from the state proposed legislation on February 9, 2010 which would require manufacturers to register with the state and pay a \$5,000 registration fee to promote recycling in Ohio (OH H.B. No. 447, 2012). Recyclers would also be required to register with the state and pay a \$300 registration fee. Under this law, manufacturers would have a recycling goal of 60% of the weight of devices

sold the previous year but there would be no punishment for not meeting this goal (Ohio Legislative Services Commission: Bill Analysis H.B. 447, 2010). The bill was assigned to the Environment & Brownfield Development Committee in the Ohio House of Representatives but stalled in this committee (Ohio status Report of the Legislation HB 447, Oct. 2012).

The Ohio Environmental Protection Agency's Office of Compliance Assistance & Pollution Prevention recommends residents recycle their electronic waste (OEPA Electronic Waste Management, Oct. 2012). The website provides a link to earth911.com for residents to find a local recycler of electronic devices. In addition to this link, the site provides residents with information of what e-waste is, why it is a problem, what components are hazardous and why the waste should be recycled. Businesses are provided with information on what computer components are considered hazardous waste and advise all businesses to test their waste to ensure that it is not hazardous. The Ohio EPA advises businesses that all computer components that are disposed without being proved non-hazardous will be considered hazardous waste by the state. Last, manufacturers are asked to join the U.S. EPA's Plug-In To eCycling campaign and provide recycling opportunities to residents in the state of Ohio (OEPA Electronic Waste Management, April 2008).

States that have Passed Legislation to Form Study Committees

Georgia Electronics Recycling

The state of Georgia does not have legislation in place that requires residents to recycle their electronic scrap, nor is there a ban on the disposal of these items in landfills in the state. In June 2005, the Georgia Computer Equipment Disposal and Recycling Council recommended that the state implement an electronic recycling program in the state to increase economic

opportunities in the state and to increase data security (GCEDRC, Electronics Recycling...Final Report, 2005). The report recommended the state to help facilitate reuse, refurbishment and recycling of electronic scrap to increase jobs, corporate incomes and tax revenues, reduce environmental risks and capture the assets in the materials currently being disposed. They recommended education of the general public and small businesses and enhancing the development of the private e-scrap collection and processing. Recommendations for the development include tax incentives for recycling and encouraging public and private funding of electronic recycling programs which train and employ persons with disabilities. The report set out eight alternatives for legislation that could be passed to raise revenue to fund a program in the state and found most could be 'economically valuable' with some alternatives providing an annual revenue of nearly \$6 million while others at least broke even. Alternatives that were proposed included retailers acting as collection sites, establishing permanent collection centers, product stewardship and advanced recycling fee programs. In 2009, Georgia Senate Resolution 83 was passed which, in part, set out to "ensure the disposal of electronics waste does not result in health and environmental hazards for the citizens of Georgia." The committee was to report their findings by December 15, 2009. However, the committee was unable to make a recommendation on the formation of a law in the state (Electronics TakeBack Coalition, 2011).

The state of Georgia does have internet resources available for businesses and residents to find information on where they can dispose of their obsolete computer products. The Georgia Department of Natural Resources Sustainability Division provides recycling information to businesses including a list of third party certified electronic scrap recyclers. Conservegeorgia.org provides education tools to individuals, businesses, educators and governments on the importance of recycling in Georgia, including electronic devices. The Georgia Department of

Community Affairs Office of Environmental Management has provided residents with a pamphlet

(<http://www.dca.state.ga.us/development/EnvironmentalManagement/programs/recycling/ElectronicRec.pdf>) with a list of recyclers and why electronic recycling is important. Residents are also encouraged to contact their “Keep Georgia Beautiful” affiliate or search for a collector on earth911.com (GDCA, Recycling, 2012).

Louisiana Electronics Recycling

The state of Louisiana does not have an electronic waste recycling law in place nor do they have a landfill ban in place. During the 2010 and 2012 legislative session House Concurrent Resolution Number 262 (HCR NO. 262) and Senate Resolution Number 83 (SR NO. 83) were passed, respectively. HCR NO. 262 resolved that the secretary of the Louisiana Department of Environmental Quality (LDEQ) set up and appoint members to an Electronic Recycling and Reuse Task Force. The task force was supposed to “determine viable methods that citizens could recycle and reuse electronic devices.” Additionally, they needed to eliminate the environmental threat from landfill disposal of electronics. SR NO. 83 went further to “urge and request the LDEQ to research and study the establishment of a recycling and collection system for electronic wastes” in the state. The study would need to look at how the system would be funded and how feasible it would be to ban electronic waste from being disposed in landfills. The legislation gave LDEQ until March 1, 2013 to report its findings to the state legislature. A source with the LDEQ told me that they have formed a workgroup to try to establish viable infrastructure for electronic recycling in the state (Personal Communication, Oct. 4, 2012). The workgroup consists of manufacturers, retailers, recyclers, nonprofit organizations and parish governments. The

representative believes that this workgroup could lead to future legislation or policy on the recycling of electronics in Louisiana.

The Louisiana Department of Environmental Quality has set up a website (<http://www.deq.louisiana.gov/portal/default.aspx?tabid=177>) which details the importance of electronics recycling. The page warns viewers that landfill operators may ban the disposal of these items because of the hazardous components in the waste. Residents are told that they should avoid landfill disposal to preserve the resources in the items as well. Non-residential waste disposers are advised to conduct a hazardous waste determination. The website then gives citizens questions they should ask themselves when trying to determine what they should do when they purchase a new electronic device. Questions include: whether the manufacturer has a take-back program, can the old equipment be upgraded and are there local locations where the equipment can be donated. A link listing all the recyclers in the state is included and residents are encouraged at the bottom of the page to contact the LDEQ for assistance on where the nearest recycling opportunity is located.

Mississippi Electronics Recycling

The state of Mississippi does not have legislation which required residents or manufacturers to fund a program to ensure obsolete electronic devices are recycled in the state. Additionally, there is no legislation that prohibits residents from disposing of their electronic items in Mississippi landfills and incinerators. Senate Bill No. 2796 was passed in 2009 which was aimed at developing a policy for the disposal of state agency generated electronic equipment and to form a committee to look into whether it would be feasible to implement a statewide recycling program for electronics. The committee recommended state agencies to donate their

obsolete electronics to local governments for reuse or collection for recycling (Recommendations to the Governor and MS Legislature on READ Services, Nov. 2009). For households that generate electronic waste in Mississippi they are able to dispose of their items in their household solid waste. However, many waste collectors and landfill operators are banning the items from their facilities thus a statewide ban was not needed at the time. It was also found that manufacturer or consumer funded electronic waste collection and recycling program was not feasible in the state either.

Although no laws are in place requiring recycling, the Mississippi Department of Environmental Quality maintains a website which recommends recycling computers (MS DEQ Computer Recycling Guidance, Oct. 2012). The website lists collection facilities in the state as well as one time computer and electronics collection events. Information on the environmental concerns associated with electronic devices is spelled out as well as where toxic components are found in each item. The benefits of recycling of computers, as well as how they are recycled, is given to residents. Last, residents are given information on how to prevent and reduce the amount of electronic waste they produce and how to delete sensitive hard drive information (MS DEQ E-Waste Program, Oct. 2012). Reduction methods include leasing devices, repair items instead of replacing them and purchasing items that can be upgraded.

Nevada Electronics Recycling

The state of Nevada does not have legislation in place which requires manufacturers to implement recycling programs in the state for electronic waste. There is also no disposal ban in place for residents who wish to dispose of their obsolete electronic devices in landfills and incinerators in the state. Legislation was proposed in 2009 (NV AB 426 Report History, 2009) to

implement a manufacturer funded statewide take-back program. The legislation was modeled after the program in place in the state of Oregon. After the bill, Nevada Assembly Bill 426, was introduced (NV AB 426, as introduced, Mar. 2009), committee hearings from numerous interest groups testified on the proposed law (NDEQ National Electronic Waste Reuse & Recycling Study: Background, 2011). Most of the testimonies indicated that electronic waste was being recycled in the state but the service was not adequately promoted to residents. In the end many of the amendments of the bill were repealed and the bill was passed (NV AB 426, as enrolled, May 2009) requiring the Nevada Department of Environmental Protection to do three things. First, they were to conduct an inventory of the programs for reuse and recycling in place in the state and in surrounding states. Second, evaluate all programs on the pros and cons with each. Last, they were required to report to the legislature their recommendation on possible legislation. The Nevada Department of Environmental Protection recommended that no legislation be passed because most of the state had access to recycling, concerns about cost associated with the program and the potential for a national program being implemented by the US EPA (NDEP National Electronic Waste Reuse & Recycling Study: Recommendations, 2011).

With Nevada choosing to stay with a voluntary recycling program the state has decided to develop and promote electronics recycling through nevadarecycles.gov. The website provides information on the potential hazards of electronic waste (Nevada Recycles Managing Your E-Waste, Sept. 2011). A very extensive list of collection sites for residents is provided with the types of items that will be accepted. Links to non-state websites are provided to give more information on laws and regulations in other states. Last, a report on the amount of electronic waste reused and recycled in the state is provided to consumers.

States that have Either Not Proposed or Provided Proposed Legislation

Alabama Electronics Recycling

Alabama does not have a law in place that requires the recycling of electronic waste nor is there a law prohibiting waste from being disposed in landfills. The Alabama Department of Environmental Management (ADAM, Waste/Remediation Programs) does not have a page detailing the importance of recycling of this material and only provides a 1 page list of recyclers that residents can contact for the handling of their used electronic waste.

Alaska Electronics Recycling

Alaska does not have any regulation in place which requires the recycling of electronic waste in the state from households. There are no regulations in place that prohibit the disposal of electronic waste in landfills. Logistics and transportation cost for disposing these items is a major factor why no law has been passed according to a source with the state. The nearest processing facility for residents of the state is in Washington. Items that are collected for recycling are shipped to Anchorage and loaded on a barge for processing in Washington (Personal Communication, Oct. 23, 2012). The Alaska Department of Environmental Conservation does not have a specific page with information for residents on why recycling of these devices is important nor where residents can recycle these devices. The Division of Environmental Health, Solid Waste Program provides a tip sheet with information on the best ways to dispose of these devices (ADEC "Tips for Solid Waste Management in Rural Alaska, Aug. 2011). The tip sheet encourages the recycling of electronic waste because of the toxic components contained in the devices. Additionally, the Solid Waste Program conducts outreach programs to rural areas of the state to encourage recycling and inform residents on the hazards of improper disposal. Many villages have received grants to fund 'backhaul' programs to ship

electronic waste to Anchorage. If collection facilities are not available, residents are advised to dispose of their items in a permitted, lined landfill (ADEC Solid Waste Program Website, Sept. 5, 2012).

Arkansas Electronics Recycling

The state of Arkansas does not have an electronic waste recycling law in place currently. In 2010 the state legislature gave the Arkansas Department of Environmental Quality (ADEQ) the authority to ban electronic waste from municipal solid waste landfills in the state (AR SB 948, 2007). As of October 1, 2012, the ban has not been put in place (ADEQ Electronics Reuse and Recycling Webpage). The Solid Waste Management Division of ADEQ recommends that households recycle these devices however, they may dispose of them in landfills as long as the local landfill accepts the device. For businesses and government, electronic waste can be subject to hazardous waste rules in place but in general, electronic waste is handled as universal waste.

The ADEQ website

(http://www.adeq.state.ar.us/solwaste/branch_recycling/electronics_reuse_and_recycling.htm)

is very detailed on the importance of electronic waste recycling. Information that is included are the toxins that are present in the waste, what are considered consumer electronics, options for reusing electronics and options for recycling electronic waste. A list of household hazardous waste collection and recycling centers is provided to residents looking to properly dispose of e-waste. A link to earth911.com is included as well to provide information on recycling of all waste including electronics. Last a list of manufacturers with recycling programs is located on the page. Grants are available to entities in the state of Arkansas to reduce the cost of recycling of electronics (ADEQ E-Waste Grants Webpage,

http://www.adeg.state.ar.us/solwaste/branch_recycling/e-waste-grants/e-waste_grants_program.htm). These grants were approved through the Special Revenue

Electronic Recycling Act 512 of 2007 and The Arkansas Computer and Electronic Solid Waste Management Act A.C.A § 25-34-101. This act permits the state to set up rules which prohibit the disposal of electronics in landfills and incinerators in the state.

Delaware Electronics Recycling

The state of Delaware does not have a law requiring residents to recycle their obsolete electronics nor is there a ban on the disposal of these items in Delaware landfills. The Delaware Department of Natural Resources and Environmental Control (DDNREC) encourages residents to recycle their electronic devices. The DDNREC (Website, “What’s recyclable in Delaware?” Oct. 2012) provides residents with a link to the Delaware Solid Waste Authority to inform them what electronic waste is, why it can be dangerous, what regulations are in place and where to properly recycle these items (DSWA. Electronic Waste, Oct. 2012). The only regulation in place in Delaware related to electronic waste is the EPA’s CRT rule which requires large quantity generators to treat CRT’s as hazardous waste if they are unable to recycle the devices properly.

The Delaware Solid Waste Authority offers pickup of electronic devices from businesses, schools and non-profit agencies (DSWA, Electronic Goods Recycling for Businesses... Oct. 2012). An appointment needs to be scheduled in advance for the devices to be picked up. Businesses can have an unlimited amount of electronic goods picked up from this agency for a flat rate of \$25. Schools and non-profit agencies are not subject to a fee for this service. Residents of the state are provided with a list of collection stations in the state as well as a list of frequently

asked questions and a brochure of the benefits of recycling these devices rather than disposing them in landfills (DSWA. Electronic Goods Recycling for Residents, Oct. 2012).

Iowa Electronics Recycling

The state of Iowa does not have legislation in place which requires recycling of obsolete electronic devices nor is there a ban on the disposal of these items in Iowa landfills. Iowa Administrative Code Chapter 567-122 (2010) requires collectors and recyclers of cathode ray tube to register with the state but the requirements stop there. Although there is no legislation in place requiring residents to recycle their obsolete devices the Iowa Department of Natural Resources (IDNR) provides residents with a great deal of information on how to handle their waste electronics and the hazards associated with these devices (IDNR E-Waste, 2012). The IDNR lists four options for the handling of unwanted electronics: donation and reuse, repair, refurbish or upgrade, sell or trade and recycling (IDNR E-Waste What to do with Unwanted Electronics, 2012). Major manufacturers that have nationwide take-back programs are listed on the state website and advice is given to residents to consider when purchasing new items. Landfill disposal of these items is noticeably left off the list of disposal options. Environmental and health hazards are listed for the major hazardous elements found in computers. The state focuses on six components that could be potentially dangerous these are: lead, cadmium, mercury, hexavalent chromium, PVC, and brominated flame retardants (IDNR E-Waste Environmental Health Hazards, 2012). Each element has several bullets that list the health hazards with each item and where it can be found in computers.

Kansas Electronics Recycling

The state of Kansas does not have a law which requires residents to recycle their electronic waste nor is there a ban on the disposal of these items in Kansas landfills. A representative with the state believed efforts by private companies and local governments have been more effective at collecting and recycling obsolete electronic devices than a law or regulation would be (Personal Communication, Oct. 24, 2012). The Kansas Department of Health and Environment's (KDHE) Bureau of Waste Management does provide grants to promote the increased collection of electronic waste. A cathode ray tube (CRT) initiative is in place where local governments can be reimbursed to help offset the cost of collection and proper disposal of these devices (KDHE CRT Initiative, Oct. 2012). To be reimbursed the county, city or regional solid waste management entity must ensure that all CRTs are collected from Kansas residents, schools or government offices. If the collection comes from businesses, the local entity cannot be reimbursed. Additionally, e-waste collection facilities in the state can apply for grants (KDHE Competitive Plan Implementation Grant Program, Oct. 2012) to collect other types of electronic waste for further processing downstream. Collection facilities must ensure that they comply with all environmental and safety laws in place, that data on devices being collected is secure, only items that cannot be sent to downstream vendors may be disposed, report to KDHE the weight of all materials received, and maintain documentation of any waste that is exported.

In 2008 the KDHE's Bureau of Waste Management released a revised policy on electronic waste disposal in Kansas landfills (KS BWM Policy 05-02, E-Waste Management in Landfills, 2008). The policy document mentioned that passing legislation requiring residents to recycle electronic waste could be harmful since many rural residents, at that time, did not have access to electronic waste collection and recycling in the state. Additionally, applying hazardous waste restrictions on the waste to business and industry would be difficult because the waste

comes from multiple sources (households, small quantity hazardous waste generators, or regulated hazardous waste generators) and it would be nearly impossible to identify the source of the waste if it was found in a landfill. The policy set the preferred order of e-waste disposal as: 1. Equipment reuse, 2. Materials recycling, 3. Landfill disposal in permitted municipal solid waste landfills. A representative with the state said most cities and counties do not support a landfill ban, especially rural counties. The concern with this is a landfill ban could lead to illegal open dumping of these items. They also encouraged facilities that process electronic waste, by crushing or grinding, to obtain a “reclamation facility permit” to ensure proper disposal is occurring and financial assurances are in place to remove waste should the facility go out of business.

The Kansas Department of Health and Environment also runs a website to promote recycling and e-waste recycling in the state (<http://www.ksewaste.org/>). The site provides residents with a definition of what electronic waste is, where this waste can be recycled, and why it is important to recycle the waste. Additionally, brochures and posters are available as well as links for processing facilities that wish to obtain a permit to operate in the state. Last, the state supports an effort to build a website which provides recycling information and a map of recyclers located throughout the state in addition to a list of collection facilities organized alphabetically by city.

Kentucky Electronics Recycling

The commonwealth of Kentucky does not have a law in place that requires residents to recycle electronic waste produced by households. The Department for Environmental Protection, Division of Waste Management does provide a list of known electronic recyclers that

operate in Kentucky (KDEP Electronics Recycling, Sept. 2012). However, the division does not endorse any recycling business or organization. The list provided is organized by counties and provides street address, telephone number, and websites or email addresses. The department advises residents to contact the recycler to obtain information on what waste is accepted and if there are any charges for disposing of the waste. Additionally, they advise residents to call their local solid waste coordinator to find more information on disposal options (KDEP Electronic Recycling Opportunities, Sept. 2012).

As stated above, there is no law in place requiring households to recycle electronic waste. Additionally, there is no law in place prohibiting electronic waste from being disposed in Kentucky landfills. Residents may legally dispose of these items in their garbage, but they are encouraged to contact their waste collector to ensure that they can collect it and the landfill will accept these materials. The Recycling and Local Assistance Branch strongly encourages these devices to be recycled by households (KDEP Electronics Recycling). Outside of household disposal, electronic waste is subject to state and federal law where it can be classified as hazardous waste.

Kentucky considers businesses that send electronic waste for disposal generators of hazardous waste and must follow Resource Conservation and Recovery Act (RCRA) requirements for compliance as small or large quantity generators (KDEP E-Scrap Laws, Sept. 2012). Businesses that choose to recycle their e-waste are not subject to RCRA requirements but they must ensure that they sell the waste to legitimate recyclers. The state lists five locations where hazardous materials can be located in computers. Lead in cathode ray tube monitors tops the list followed by mercury in flat panel displays. Lead, chromium, silver, cadmium and mercury are contained in

printed circuit boards. Lead, mercury, cadmium and lithium are in batteries and PCBs can be contained in circuit boards manufactured before the early 1980s.

North Dakota Electronics Recycling

The state of North Dakota does not have a law in place that requires recycling or prohibits the disposal of obsolete electronic devices in landfills and incinerators in the state. Although this is the case, the North Dakota Department of Health encourages residents to recycle their obsolete electronic devices (ND DEH Electronics, Oct. 2012). The Division of Waste Management maintains a website which provides residents with a list of recycling facilities located both in North Dakota and surrounding states (ND DEH Electronic Recycling Facilities, Oct. 2012). Additional links are included to outside organizations which provide information on who will accept all types of devices including cell phones. Information on the Cathode Ray Tube Rule requirements is included for businesses on how to handle both broken and intact CRTs for disposal. Finally, organizations are asked to participate in the voluntary State Electronics Challenge run by the US EPA.

South Dakota Electronics Recycling

The state of South Dakota does not have a law which requires manufacturers to provide recycling opportunities for residents of the state. In addition, there is no ban to residents on the disposal of their obsolete electronic devices in South Dakota landfills. The South Dakota Department of Environment and Natural Resources does encourage recycling of these devices (SD DENR Electronics Recyclers, Oct. 2012). The Waste Management Program in the state operates a website which provides links to residents and business owners on the available manufacturer take-back programs offered in the state. In addition recyclers are listed on the

website in alphabetical order by city in South Dakota first then in alphabetical order by state.

Each company listing describes the items that are able to be collected and any costs associated with collecting these items to consumers.

Tennessee Electronics Recycling

Tennessee does not have a law that requires residents to recycle their electronic waste nor is there a ban of the disposal of these items from households in Tennessee landfills. A representative from Tennessee noted that state legislation isn't necessary currently (Personal Communication, Oct. 8, 2012). They said the state is seeing success and responsible recycling programs based on a market driven approach. The representative felt that electronic recycling markets are well developed in the state. Most county governments and some municipalities provide collection for residents through year round collection programs or electronics recycling events.

The Tennessee Department of Environment & Conservation (TDEC) has a great amount of information available to citizens, communities, businesses and recyclers on their options relating to electronic waste disposal. Citizens are strongly encouraged to recycle their old electronic products (TDEC Households and Individuals, Oct. 2012). The website gives a list of national retail chain stores that offer in-store recycling and advises that local and regional stores can offer this service as well. Citizens are also encouraged to contact their local solid waste department to find community events for recycling or options for year round collection. The department also informs citizens that several manufacturers have take-back programs in place. Last, citizens are encouraged to donate their items to charitable organizations.

TDEC gives communities advice on how to plan and run a collection program (TDEC Communities Respond to Growth of e-waste, Oct. 2012). Questions that communities have to answer include: what type of waste will be collected, who is eligible to participate, will there be a fee, where will collection and storage take place, and how to select a contractor to manage the waste. Electronic waste recyclers and recovered material processors are not required to register with the state as recyclers of electronics (TDEC Recyclers and Recovered Material Processors – FAQ, Oct. 2012). These facilities may have to register with the TDEC, specifically the Division of Solid Waste, if they are not solely a “recovered materials processing facility.” TCA 68-211-802 defines a recovered material processing facility as: “A recovered materials processing facility means a facility engaged solely in the storage, processing and resale or reuse of recovered materials. A recovered materials processing facility is not a solid waste processing facility.” Stated plainly, if the facility minimally processes the waste, waste is presorted before arriving, it is not accumulated speculatively and there is a viable end-market available and being utilized the e-waste recycling facility does not need to register with TDEC.

Institutions and businesses are strongly encouraged to recycle their electronic waste (TDEC Businesses and Institutions – FAQ, Oct. 2012). The TDEC recommends recycling because it can be a cheaper disposal option than disposing the items in hazardous waste facilities. Businesses and institutions can dispose of these items in municipal landfills if they pass hazardous waste determination tests.

Wyoming Electronics Recycling

The state of Wyoming does not have legislation which requires residents to recycle their obsolete electronic devices nor are there any prohibitions on the disposal of these items in

Wyoming landfills. The Wyoming Department of Environmental Quality's Solid and Hazardous Waste Division encourages residents to recycle these devices (WY DEQ – Recycling, Waste Reduction and Beneficial Use, Oct. 2012). Currently the department is working on updating their website for residents to find recycling information but links to a complete directory of recyclers in the state from 2009 – 2010 is made available (Wyoming Recycling Directory). The directory advises residents to call electronics recyclers to call individual collectors ahead to learn of any fees that may apply to the collection of the devices.

Conclusion

In total, there are 24 states with laws that require some form of recycling program to be implemented in the state. 23 of these states require manufacturers to make recycling available to residents in some form. Manufacturers may be asked to make recycling collection programs available to citizens through permanent collection sites or mail-back programs. States that are within this group can vary further on the cost of collection to residents and recycling goals manufacturers have to meet. Other states have decided to run their own collection program and have manufacturers of electronic devices cover the cost of program. California is the only state which does not place the responsibility of funding recycling in the state on manufacturers of electronic products. Residents pay an additional fee when purchasing items in order to receive free recycling of covered electronics in the state. Five additional states have passed legislation that encourages recycling of electronic devices either through mandatory education programs or a ban on the disposal of certain electronic devices. With so many states having laws that require some form of recycling there can be a great deal of confusion among residents and manufacturers on the proper handling of electronics. The list of covered electronics varies from state to state. Manufacturers are subject to further confusion with registration dates, fees and program requirements varying greatly among states. With all this variability from state to state, one thing that is consistent in the legislation is national legislation will replace many of the pieces of legislation that is in place in the states.

Until national legislation is in place, the confusion among manufacturers and residents as well as the disposal of electronics in landfills will continue. In June of 2011, bi-partisan legislation was introduced in the U.S. House of Representatives (June 22) and the U.S. Senate (June 23). The proposed legislation was entitled the "Responsible Electronics Recycling Act"

(H.B. 2284 and S. 1270, June 2011). The legislation was primarily aimed at restricting companies from exporting obsolete electronic devices from the United States to countries that were not members of the Organization for Economic Cooperation and Development (OECD), the European Union (EU) or Liechtenstein. The legislation would establish criminal penalties to those who knowingly exported “restricted electronic waste.” The list of “restricted electronic waste” includes: computers, computer accessories, televisions, television peripherals, video displays, digital audio players and telephones... (H.B. 2284 and S.B. 1270, June 2011). These items must contain some amount of toxic elements or compounds to be considered for this list. Examples of these compounds include: lead, cadmium, mercury, organic solvents, hexavalent chromium, beryllium or other toxic ingredients. People who handle these items would be required to obtain EPA and state permits and funds would be available through grants for research in the recycling of the ‘rare earth materials’ found in electronic devices. In both chambers of the U.S. Legislature the bills were referred to committee but have stalled there.

Although legislation is not in place across the whole country, the speed that states have responded to the problem of electronic waste is encouraging. This review found only 11 states that did not have legislation proposed that would require recycling programs to be implemented statewide. Residents are becoming more aware of the potential dangers of not properly disposing of electronic waste. In addition, the Coalition for American Electronics Recycling (<http://www.americanerecycling.org/>) has formed and consists of 77 electronic waste processing members as of September 11, 2012. This group, along with several electronics manufacturers, is pushing for congress to pass legislation to increase recycling of these devices and prevent their shipment overseas.

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